



FRIDAY, JUNE 16, 1876.

## Mogul Engine for the Dom Pedro Segundo Railroad.

The following are the specifications published of a mogul freight locomotive built for the Dom Pedro Segundo Railroad of Brazil by the Baldwin Locomotive Works, and exhibited by it at the International Exhibition in Section E 6 of Machinery Hall, at columns 41-42. It is of 5 ft. 3 in. gauge, and will burn bituminous coal:

Cylinders.	
Diameter.....	1 ft. 6 in.
Stroke of piston.....	2 "
Length of steam-ports.....	1 "
Width of steam-ports.....	1 1/2 "
Width of exhaust-ports.....	2 1/2 "
Travel of valve.....	3 1/2 "
Outside lap of valves.....	1-3/4 "
Inside lap of valves.....	1-3/4 "
Exhaust nozzles—double, variable.	
Wheels.	
Diameter of driving-wheels.....	4 ft. 6 in.
Diameter of truck-wheels.....	2 "
Distance between centres of front and rear driving-wheels.....	15 "
Total wheel-base of locomotive.....	22 "
Total wheel-base of locomotive and tender.....	44 "
Diameter of driving-axle journals.....	7 "
Length of driving-axle journals.....	8 "
Diameter of main crank-pin bearing.....	4 1/4 "
Length of main crank-pin bearing.....	4 1/2 "
Boiler.	
Outside diameter of smallest ring of boiler.....	4 ft. 3 in.
Thickness of boiler plates (iron).....	3/8 "

ject that it is a very important one to all railroad companies (by which we are employed). We are fully satisfied that it is one of the greatest sources of expense, and mainly in consequence of defective construction in some cases, and we may say, to a large extent, the principle mechanically wrong of making them too far below the most effective line of resistance, and also very insecurely fastened to the body of the car, quite a large number of the old style of draw-bar being attached to a plank, and connected to the car by a strap at the rear end, through which the king bolt or centre pin passes. These are a source of great expense, and frequently pull out the end sill of the car. Others are attached by a wrought-iron strap passing around the follower, and the strains brought upon them, being to their disadvantage, breaks them in the angles quite frequently, and causes large expense. Other attachments we might mention, such as are made by cast-iron pockets falling below the line of attachment, that are easily broken, not giving proper security against the shocks that all buffers are subject to. This, perhaps, is sufficient in regard to improper construction, only your committee would add that we have reason to believe too many of our car-builders continue to use these objectionable attachments for no other reason than that they have them on their road, and they have always used them. Other reasons might be given, but which seem to the minds of your committee to be very unreasonable in these times of improvement and economy. It is also very apparent to your committee that if it were possible to adopt a uniform system of draw-bars and the same kind of attachment to all cars built in future, with the prospect of their being sometimes all the same throughout the country, or at least on those roads that run directly in connection with each other, it would be of great advantage and economy to companies. We find upon examination that this is not only a very important but a very difficult question to solve. It is a matter that has attracted the attention of many inventors, and the production has been numerous of patent devices for coupling cars. Some few of them have considerable merit, but few if any are entirely free from objections. The main object in the minds of most inventors seems to be to get an automatic coupler, and the public generally seems to entertain the idea that the

Your committee sent circulars to all master car builders with the following interrogations, and we have replies from some 23 of them, as follows:

Interrogation 1. "Which would you recommend as most economical for freight car, wrought iron or cast iron draw bars?"

One says wrought iron he thinks more economical than any cast iron we have used, but there may be some cast iron draw bars that would give better results than any we have had.

One says: "Neither cast nor wrought iron, but steel, Chester Steel Co.'s make. Has used them for 16 years. First cost is all." One says: "I am using cast iron entirely, and consider it cheaper and better than wrought iron." One says: "Our road is equipped with wrought iron, and is not prepared to say which is the most economical, but judging from the breakage on foreign cars running over his road should say wrought iron was the cheapest. One says: "Cast iron is the cheapest. I judge from the number we have in use and the repairs we have to do on wrought iron hangers for foreign cars." One says cast iron with wrought iron at back end, riveted on to the cast iron, gives the best result.

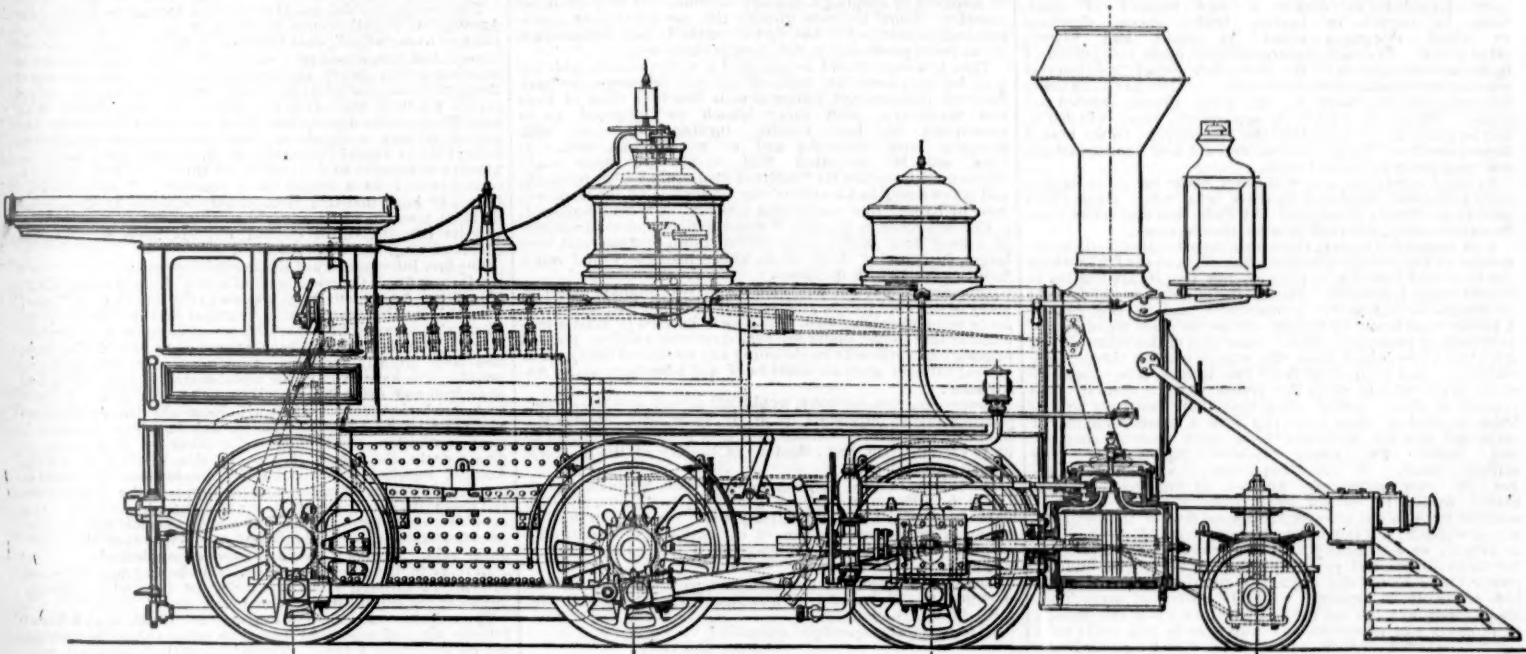
One says: "Cast iron by 75 per cent. We have not discarded wrought iron entirely." One says: "Cast iron is unquestionably the cheapest and the most economical to use." Eight say: "Cast iron," with no comments. Two say: "Wrought iron," with no remarks.

In addition to the above, a number of those who consider cast iron the best to use would recommend the Safford improvement as a matter of safety to the train-men.

2d Question. "Can you give the committee the first cost and also the proportion of failures between wrought and cast iron?"

One says: "Three to one in favor of cast iron." One says: "It cost about 6 per cent. of first cost to maintain wrought iron." One says: "I have no exact data," but is quite in favor of cast iron. One says: "The failure of the wrought iron is twice the amount of cast iron, and the expense of keeping them up is as much more. Eleven give no expression on this question."

3d Question. "What should be the plan of attachment at the back end of draw-bar? Please show by a drawing if possible."



From the Illustrated Catalogue of the International Exhibition 1876.

## MOGUL LOCOMOTIVE FOR THE DOM PEDRO SEGUNDO RAILROAD, BUILT BY THE BALDWIN LOCOMOTIVE WORKS.

Exhibited at the United States International Exhibition.

Number of tubes.....	159
Length of tubes.....	11 " 2 1/2 "
Outside diameter of tubes.....	5 " 2 "
Length of fire-box inside.....	5 " 5 "
Width of fire-box inside.....	2 " 11 1/2 "
Depth of fire-box inside.....	8 " 3 1/2 "
Thickness of fire-box plates (copper), side, back, and front sheets.....	3/8 "
Thickness of fire-sheet.....	3/8 "
Thickness of crown-sheet (steel).....	3/8 "
Square feet of grate surface.....	16
Square feet of heating surface in fire-box.....	103
Square feet of heating surface in tubes.....	937
Total square feet of heating surface.....	1,040

Tender.	
Number of wheels.....	8
Diameter of wheels.....	2 ft. 4 in.
Diameter of tender-axle journals.....	3 1/2 "
Length of tender-axle journals.....	7 "
Capacity of tank.....	2,000 gallons.

Weight.	
Weight of engine in working order.....	80,000 pounds.
Weight of engine on driving-wheels.....	68,000 "
Weight of tender, empty.....	20,000 "

**Materials.**  
Boiler, J. L. Bailey & Co.'s "Pine" iron; Fire-Box, Hendricks Bros. copper; Tubes, Standard Steel Works' crucible steel; Engine, Truck, and Tender Wheels, Ramapo Wheel & Foundry Co.'s double-plate chilled wheels; Flues, W. C. Allison & Sons' lap-welded charcoal iron boiler tubes; Injector, William Sellers & Co.; Steam-Gauge, Buffalo Steam-Gauge & Lantern Co.; Brass and Copper Piping, Benedict & Burnham Manufacturing Co.; Staybolts and Tank Iron, Catasauqua Manufacturing Co.; Jacket Iron, W. D. Wood & Co.'s patent planished sheet-iron; Head Light, Philadelphia Railroad Lamp Works.

## MASTER CAR BUILDERS' ASSOCIATION.

## Tenth Annual Convention.

This convention began its session in New York last Wednesday. The following committee reports were presented:

## REPORT ON DRAW-BARS AND BUFFERS.

Mr. President and Gentlemen of the Master Car Builders' Association:

Your committee appointed to report on draw-bars and buffers would respectfully submit the following:

Your committee find by a careful consideration of this sub-

ject of the case requires an automatic coupler. Your committee has to a certain extent favored this idea, but upon more mature deliberation and upon carefully considering the matter of handling freight cars, we are strongly inclined to think that an automatic coupler for freight cars will be better in theory than in practical use. Your committee have by careful investigation come to this conclusion, that our freight cars should have certainly more of a cushioned or spring resistance than any now in use that is known to the committee, also that the security to the body should be stronger and nearer in the line of concussion than is now used by many of our roads; and your committee would recommend as a standard attachment for the rear or back end what is shown by the accompanying drawing. Your committee is not as fully decided in regard to a plan of connection of one car with another. The devices are numerous and also quite various in style and plan of connecting. Some, as your committee think, very important ideas could be obtained. One is that we secure safe and sure connection, without pin or link, before we adapt as a body anything for a standard; and it should be thoroughly tried and proven satisfactory to competent judges.

Your committee has been shown some ingenious, and we might add good, devices, but we fear that in some such cases the change is so radical and attended with so much expense that it would be very difficult to get any company or any number of companies to entertain the idea of its adoption at all. Others we have examined that have a good deal of merit, and are entitled to our consideration, but are not free from valid objections, and most certainly should be thoroughly tried before we, as an association, sanction them. Our attention has been called by letter to other devices claimed to be superior to any yet brought out, proposing to have models here at this meeting.

Your committee would add that we believe that much has been gained by the adoption at our convention some years ago at Richmond of a standard height for our freight cars of 2 feet and 9 inches from top of rail to centre of draw-head, and we believe a large number of our roads are conforming to this standard, thereby lessening the damage and adding to the safety of men. We would also unanimously condemn the use of all draw-bar attachments placed below and attached to the underside of timbers or plank, as used in many cars at present. One other point, the follower plates are much too light and weakened by being made small at the ends. Cars are constantly or daily refused by connecting roads on this account, and the damage from this cause alone is quite large.

Only a few give any idea of the manner of securing the back end of draw bar to the car, and they favor the plan now used by a number of roads of bolting the draw timbers firmly under the middle stringer of floor timber, and upon the side of these bolting four cast-iron pieces or lugs that are held firmly by three bolts in each and have in addition three dowels cast upon them to add strength and secure them in position. Between these the followers move, the whole being secured from the head block or dead wood by a rod on each side passing through the bolster. Some sketches are sent and drawings to be presented here at this time to show their plans.

One says, "Beal's plan is the best I know of;" one says he has not fully made up his mind; others are indefinite.

4th Question. "Do you know of any plan for self-coupling or for dispensing with the use of pin and link, or for using continuous draw-bar, which you think practicable? If so, please describe them."

One says the Janny is the best he has seen, but he does not give any description. One says he has introduced one of his own self-couplers, but does not describe it. One says he uses a self-coupler, but does not give the name or description definitely; also that he has two cars in use since last August that do not use link or pin and will couple on to any car, but does not describe it. I suppose he will here in convention. One says he does not know of any, but several are approaching in the right direction, and thinks that it will be accomplished. One says he has in use for two years Griffith's continuous draw-bar on 127 cars, and believes it to be the best; but would suggest the use of Safford's improvement on the cast-iron head. One says he favors a self-coupler, and says he will have a model here. It is a late invention, but uses link and is so connected that it cannot get out. One says he does not know of any plan for self-coupling. Would favor securing the pins so as to save loss. One says they have what is called the Enos coupler, which gives good results. Others say they know of nothing practically an improvement.

5th Question. "Have you any information as to what it costs your company for pins and links a year?"

One says they have no accurate accounts, but all train-men try to get all they can from other companies, and think it all right. One says he cannot give the amount, but that it is enormous. One says the average miles run to one link is 2,835, and to one pin 2,562. One says the average cost per car for 1875 was 55 cents. One says it cost them about \$9.33 per mile a year. One says it cost our company for 1875 \$6,348.52. Others do not reply to this.



5th Question. "Do you think the springs now in general use of sufficient strength and range of motion, or would you suggest any change or improvement?"

One says he thinks the springs sufficient, but suggests the use of buffers as a saving of expense. One says he thinks the springs have motion all-sufficient, but not enough strength. One says that where the draw-spring is used for a buffer spring, it should have about two inches motion and not close with less than 12 tons. One says the Hibberd spring is the best; has had better success with them than with others. One says the springs generally have motion enough, but not strength sufficient. One says the Culmer springs give the best result, but thinks springs would be better if they would not collapse. One says that he would suggest that a spring be inserted to receive a part of the blow in buffing, but not come into use in drawing, that this would save both the car and springs. One says, "the Hibberd spring three coil," but does not give length or diameter. One says a large spring or two springs would be an improvement. One says there is a deficiency in the strength of buffer springs generally, but one 7 or 8 inches long is much better than those used shorter. Others say the present is good enough, or say nothing in answer.

F. D. ADAMS,  
L. GARNY,  
C. A. SMITH.

#### REPORT ON BRAKES.

GENTLEMEN: Your Committee on Railway Car Brakes report as follows: Since the great brake trials made at Boston there have been commendable efforts made by the manufacturers and patentees of power brakes to improve them and design better forms. Models have been exhibited which promise well, but of their action in actual service your committee can say nothing, as they have not been put into actual service upon a railroad. There are some brakes at work upon different roads from which there are very good reports, but your committee have not been able to get definite records of their performance. The Longbridge brake, which was mentioned in last year's report, is giving satisfaction upon the Baltimore & Ohio road; we have not been able to obtain any particulars in regard to its operation.

Some time since a great number of very accurate experiments were made in England upon power brakes. These were intended to decide a vast number of questions in regard to brakes, brake shoes, distances in which stoppages could be made, and various other points. The main features of these trials were published in the scientific papers at the time, but considerable interest was felt in obtaining the official report. This has been ready for publication for nearly a year, being already printed and bound. When it does make its appearance, there will doubtless be much in it of interest to the Association. Of the brakes in use, the Westinghouse and vacuum are best known, and are still continuing to do good work.

At the present time none of the new plans for power brakes seem sufficiently developed to enter into active competition with those already in use, and but little new and valuable information can be collected for some time to come.

Your committee cannot close this report without calling attention to the great importance of having a power brake which can be manufactured at a price so low that its application to freight trains is possible. The saving of property which could be effected by such means is enormous, and in this respect a power train brake for freight service is even more important than on passenger trains. Some idea of the value of such a brake may be gained from the experience of those roads which have run trains with from two to three men constantly at the brake wheels while the trains were in motion. The records of these trains show that they have been far less liable to accident than those run with a smaller number of men, and that the accidents have been few in number and called for much lighter repairs of the rolling stock. It is impossible, with the number of men commonly allotted to our long through freight trains, to control such trains properly. In bad weather, in the night time, and in a good deal of the ordinary winter weather, it is impossible for men, exposed as they are, to do good or satisfactory work, and certainly it is impossible for them to respond promptly to a call for brakes. With a power brake under the engineer's control the safety to life, but especially to property, would be increased many fold. Every car-builder can call to mind instances where the damage to property was enormous, and where such loss could have easily been saved could the engineers have had a power brake and applied it at once.

Your committee are aware that the cost to railway companies would be very heavy, no matter how cheap the brake. On this account it is necessary that the cost of manufacture be as small as possible.

GEO. HACKERT,  
Central Railroad of New Jersey.  
G. W. DEMAREST,  
Northern Central Railway.

#### REPORT ON BLANKS FOR CAR REPAIR STATISTICS.

To the Master Car-Builders' Association:

GENTLEMEN: Your committee appointed at the annual convention of the Association held in the city of New York, June 9, 1875, and to whom was referred the Subject of Blank Forms to be Used by Car Builders for procuring Statistics and Information Relative to the Repairing of Cars, respectfully beg leave herewith to submit their report.

In accordance with the usages of the Association, a circular was addressed to each member, calling attention to the fact that during the past few years the attention of railroad managers has been directed, perhaps more than ever before, to the importance of keeping comprehensive, accurate, and detailed accounts in each department pertaining to a careful, systematic and judicious management of railroads, "or, in other words, of knowing where the money goes to." And as the cost of maintaining the cars forms a large percentage of the total expenses of railroads, and as these expenditures are made under the direction of the master car builders, and for which, to a considerable extent, they are held responsible, a series of questions was submitted for their consideration, and answers solicited, which your committee hoped would be all sufficient upon which to base a report. And yet your committee regret to say that with all the varied information received they are unable to report anything practicable in the line of the duty for which they were appointed.

Question 1.—"In your opinion, what expenses in car department is it desirable to keep separate and in detail?"

In reply nearly all agree that it is important and desirable that all expenses pertaining to car departments should be kept separate and in detail, as much as possible; and yet while admitting the importance of this rule there are but comparatively few railroads that are carrying it out in all its minutiae and detail.

Question 2.—"Do you think it would be desirable and profitable for the railroad companies to keep separate accounts of any of the following items, and which of them: cost and mileage of wheels; cost and mileage of axles, oil, brasses, draw bars, and attachments, links and pins, shop expenses, etc. etc.?"

In answer to this inquiry the majority of master car-builders very readily admit the importance of keeping such accounts separate, and while many are keeping such accounts in detail, there are many who do not realize its importance, or who have not sufficient facilities, and are consequently unable to do so. This your committee deem of great importance to all railroad companies. Believing that only by a thorough system rigidly enforced can they hope to obtain a satisfactory knowledge of the quality of materials used, in the various sup-

plies, such as wheels, axles, springs, brasses, oils, etc., which go so largely into the expenses of and maintenance of rolling stock on all railroads.

Question 3.—"In your opinion what should be included in shop expenses?"

On this question the majority agree that shop expenses should include all pertaining to tools and machinery, lubricating oils for same, lights and fuel for shop use, watching, maintenance of buildings, etc. This general expense to be pro-rated to other specific accounts; while others claim that no such account should exist.

Question 4.—"Do you think it would pay to keep an account of the mileage of passenger and freight cars or of either?"

In reply to the inquiry there is a wide difference of opinion. While many of our members agree that it is of the greatest importance that an accurate account should be kept with each car, both of passenger and freight, there are those who believe it essential to keep such accounts with passenger cars only; while there are others who do not believe it of such importance as to be kept with either. Your committee are fully convinced and will here observe, that where sufficient facilities are given and maintained by railroad companies to keep a faithful and accurate mileage account, it is the only way a correct solution can be arrived at or obtained to the query following:

Question 5.—"In your opinion, how can it be known whether the car department of a railroad is economically conducted?"

This question elicits answers various in their character and scope, and no doubt true from the standpoint taken by those answering the inquiry. Some of our members say, by comparing notes with other railroads of about the same capacity and equipment, and of about the same condition of rolling stock; others answer by comparing pay-rolls, by the amount of work turned out monthly and annually, and each year by that of former years. Others again answer: By having a competent man in charge, having a practical knowledge of his business and giving a close attention to it. These answers are true and important. Yet your committee more fully coincide with those who claim that with rolling stock when properly maintained to a given standard of excellence, the cost of such maintenance should in the nature of things be borne out or offset by the amount of mileage made; and this can best or most correctly be acquired by keeping a mileage account, and thus when our superiors desire to know whether the car department is economically conducted or not, figures ought to fully demonstrate it—at least, as often as a statement is made out.

This, however, should be qualified to a very considerable extent, for the reason that many of our railroad companies have their car departments equipped with the best class of tools and machinery, with every branch so arranged as to accomplish the best results, turning out work with precision and dispatch, and at a minimum cost. It must not be forgotten that there are other roads whose machinery has far "outlived its usefulness," so to speak, and is but a step in advance of the time when all the work was done by hand. In a comparison between roads thus equipped, a wide difference in the cost of construction and maintenance of rolling stock must necessarily be shown to exist, and very largely in favor of those roads whose machinery and other facilities are up with the times.

Therefore, inasmuch as such a diversity of opinion exists on many of the vital points, your committee is not prepared to offer or recommend any form of blanks to be used by master car-builders that would, under the varied circumstances at present existing, be applicable in obtaining any statistical information of real value or such as would be of any advantage to our Association.

Your committee, however, would call attention to the accompanying blanks furnished by W. B. Snow, Esq., Master Mechanic of the Illinois Central, and also to those furnished by W. E. Chamberlain, Esq., Master Car Builder of the Boston & Albany Railroad.

The Illinois Central by its system will with almost certainty obtain the mileage of every car belonging to its line, and the blank forms of the Boston & Albany road, when taken in connection with a correct system of car mileage, are admirably adapted to obtaining the mileage of axles, wheels, brasses, oils, etc., etc.

The blanks furnished by the above named parties are the most perfect and complete of any furnished or brought to the notice of your committee.

All of which is respectfully submitted.

JOHN McVAY }  
J. H. F. WRESS } Committee.  
T. B. STEWART }

#### REPORT ON FREIGHT CAR TRUCKS.

To the Master Car Builders' Association:

Your committee, appointed in 1874 and continued at convention of 1875, to whom were referred the subject of the "Best Style and Most Economical Truck for Freight Cars, Best Position and Hanging of Brakes," beg leave to present the following report:

Circulars (a form of which is herewith appended),\* were submitted to car builders and those having charge of passenger and freight cars, for the purpose of eliciting information upon which to base a report.

A majority favor, for freight cars, an iron truck with swinging bolsters and centre-bearing.

Opinions are about equally divided as to whether a locomotive can start and draw more cars with swinging-bolster truck than with rigid frame trucks.

Majority are in favor of flat side bearings, or the top flat and

\* The questions of this circular were as follows:

1st.—Do you consider an iron or wood-frame truck the best? and what are your principal reasons for preferring one or the other?

2d.—Is a truck with swinging bolsters, in your judgment, preferable to one with a rigid frame? and if so, or not, please state your reasons.

3d.—Can a locomotive, under all circumstances, start and draw more cars with swinging-bolster trucks than with rigid frame trucks? If you use swinging-bolsters, please send drawing showing position of hangers, and also state your opinion of the merits of such trucks.

4th.—Should the side-bearings take any portion of the weight, if so, how much?

5th.—What kind of side bearings do you consider the best?

6th.—Would you recommend for either iron or wood-frame trucks a short spring in the jaw over the boxes?

7th.—Do you have any difficulty in keeping iron-frame trucks square? Do you brace such trucks, and if so, in what manner, and with what results?

8th.—What distance from centre to centre of axles would you recommend as the best?

9th.—Is a centre-bearing truck, in your judgment, easier on the track and wheels than it would be with a portion of the weight on the side-bearings?

10th.—How much leverage should be allowed on the brake levers to secure efficient braking and the preservation of wheels?

11th.—Should freight cars have brakes upon both trucks? and should such brakes be placed outside of the wheels or between them?

12th.—Are your brakes so constructed and applied as to give a uniform or equal pressure upon each wheel? If so, please send description and tracing of such brakes.

13th.—Which do you consider the best plan of hanging brakes, to body of car or to truck frame?

14th.—Which, in your judgment, is the best position for the brake shaft? Should it be on the right or left hand corner of the car as you stand facing the car?

15th.—Would you, with the consent of your superior officers, favor the idea of a standard freight-car truck, duplicate in all its parts except wheels and springs?

lower bearing, with recesses for lubrication. They should take as little of the weight as possible.

A majority consider that a swing-motion truck with good springs in bolsters does not require springs over oil boxes. That when iron frame trucks are properly constructed, bracing is unnecessary, as no difficulty is found in keeping them square. Five (5) feet from centre to centre of axle is recommended as proper distance by a majority.

A centre-bearing truck is considered easiest upon track and wheels.

They also consider (3) to (1) to be the proper proportion for a brake lever, and that brakes upon one end of the car are sufficient for use upon ordinary roads; also that their brakes are so arranged as to give a uniform or equal pressure upon the wheels. Your committee, however, have received no tracing or design explanatory of such brakes. By a majority it is considered the best plan to hang the brakes to truck frames, but opinions are equally divided upon hanging brakes outside of or between the wheels.

That the brake-shaft should be on the left hand as you face the car.

A standard freight-car truck, duplicate in all its parts except wheels and springs, is favored by a majority; but your committee find that in nearly every instance where a member reports in favor of it, it is with a proviso or an addition, such as, "I do not think it possible to agree. I think it impossible that any such standard would be carried out if adopted. I think it will be impossible to obtain the consent of our superior officers." Or, "If the committee consisted of men that were not prejudiced by any pet hobbies" etc., etc.

In addition to the report of last year and the foregoing, your committee have nothing to present, and would only mention that from present indications, there does not seem to be a possibility for the general adoption of a standard freight-car truck before the next Centennial.

D. HOTT }  
JOHN KIRBY } Committee.  
W. F. SMITH }

NEW YORK, JUNE 14, 1876.

#### REPORT ON CAR WHEELS.

To the Master Car Builders' Association:

Your committee delegated at the last annual meeting of the Association to gather such information as could be obtained relative to car wheels, best methods of fitting, flange wear and causes, mileage, breakage, etc., issued the usual circular of interrogatories, specific and general, to the several members of the Association, and while the limited number of replies received reveal a lack of interest in the work of the Association, or an unwillingness to assume the labor necessary to render our success all that it should be, your committee are gratified in being able to record the receipt of more than three times the number of answers to our circular of this year than were returned in reply to a similar one a year ago. Your committee fervently hope that this interest may increase until each individual member realizes that the success of our organization, and its benefits, must depend entirely upon the personal efforts of each and every member.

The first interrogatory of the committee was:

"Do you finish the wheel-seat of axles straight or tapering?"

If tapering, how much do you allow in the length of the seat?

To this inquiry a large majority stated that they finished the wheel-seat of axles with parallel or straight fits, as they are called. Your members reply in favor of taper of 1-32 of an inch; two favor slightly tapering. One member replies that his practice is to have axles at the wheel-seats tapering about 1-32 of an inch and drive the wheels from 3 to 3 1/2 inches to their seat, and he is never troubled with loose wheels. As the pressing of wheels to a shoulder on the axle has been abandoned, your committee would invite discussion on this point, to demonstrate the merit, if any, in this method of fitting. Another member believes that by the taper fit the wheel is prevented from working on any further, and the box and the rail make it almost impossible for the wheel to work off. The most dangerous loose wheels your committee meet with in their personal experience are those that work on toward the centre of the axle. A general record of experience solicited.

In reply to the second question, "In boring wheels do you run cutters through without reaming, or bore with reamers, following the cutters in the same boring-bar?"

The responses to this question may be classified as follows: Fifteen (the major portion) bore with cutters alone by running the cutters through twice. Three bore with cutters first, running the reamers through afterward, but don't say whether they change the boring bar or change from the cutters to the reamers every time. Three bore with cutters and reamers in the same bar, the cutters preceding the reamers and taking out most of the iron, the reamers standing, the cutters produce a straight and perfect hole, making the wheels fit the axle and the whole surface of the inside of the bore.

The replies to our inquiry for the maximum and minimum pressure required in pressing wheels to their seats on the axle indicate anything but uniformity in this matter: indeed your committee inferred that some of the replies were hardly based on definite calculations. One member gives the maximum sixty and the minimum at forty tons; another at twenty-five and twenty respectively. Some use the screw press, and cannot estimate the pressure given.

Your committee recommend a pressure not less than twenty-five tons and not exceeding thirty, and the exercise of great care in boring the wheels so that the hole in the wheel shall be perfectly round and true. The experience of your committee has fully demonstrated the fact that a wheel bored perfectly true will stand a greater pressure without bursting than one bored with a deviation from such exactness.

In reply to the fourth question: "Do you find the flange wear of wheels in six-wheel trucks to be the same in proportion as in four-wheel trucks? please state your experience," all the replies but one state that there is little or no difference, with which opinion your committee are inclined to coincide.

In reply to question 5: "Which, in your experience, gives the greater mileage, a broad or narrow-tread wheel?" the prevailing opinion seems to be that there is no perceptible difference in the wear of the tread, but that the narrow-tread wheels are less liable to break at the outside of the tread than broad-tread are; consequently the narrow-tread wheels should make a greater average mileage than broad tread. Your committee consider it a misfortune to railroad companies that broad-tread wheels have to be used.

The replies to our inquiry as to the use of roller side bearings indicate that their use is not at all general, but confined to a few roads only.

Our inquiry as to the cause of the wear of the flanges of wheels has not been productive of as much information as we had looked for, and opinions seem greatly at variance. Perhaps the majority incline to the belief that this wear is caused by the difference of circumference in the two wheels on the same axle, or, first, difference of circumference of wheels; second, truck out of square; third, too much weight on side bearings. A careful and thorough investigation for the cause of this is recommended.

Our inquiry, and replies to such, as to the chill of wheels shows little exception to the general practice of chilling narrow-tread wheels nearly across the tread and flange, and broad-tread wheels from three-quarters of an inch to one inch. Most replies indicate the absence of a uniform, even chill. It is not herein a pertinent hint to the wheel makers?

The inquiries made in reference to a record of the mileage made by wheels under passenger and freight cars reveals the fact that but a very few of the railroads represented in our



Association approximate even a definite method of keeping such mileage. Most of the replies indicate that the mileage is estimated from the length of time in service; but calculations made from such data must always operate against the railroad companies we represent, and in favor of the wheel makers. Your committee are therefore agreed that they cannot urge too strongly the importance of an accurate method of keeping the exact mileage of car wheels. No satisfactory plan has yet been found for keeping the mileage of wheels under the freight equipment of those roads whose interchange of cars is bounded only by the continent; but the mileage of passenger cars and the wheels under them can be kept, simply and without much expense. Several railroad companies since our last annual meeting have inaugurated a system with a view of ascertaining the mileage made by wheels under their passenger equipment. Such railroad companies are unable to make any satisfactory report to this meeting. The Lake Shore & Michigan Southern Railway Company have been keeping the mileage of all wheels under their passenger equipment for some three years by a method which seems to be simple and gives very good satisfaction. For the benefit of such members as may desire information of their method, your committee would refer them to the *Railroad Gazette* of December 25, 1875.

(TO BE CONTINUED.)

## Contributions.

### Eighth Annual Convention of the American Society of Civil Engineers.

PHILADELPHIA, June 14.  
According to announcement this Society met in the Judges' Hall in the Centennial grounds in Philadelphia Tuesday last at the appointed hour. About 75 members were in attendance at the opening of the meeting. An address was made by Gen. Theo. G. Ellis, on the part of the officers of the Association, in which the history and progress of engineering in this country during the past hundred years was reviewed. After concluding his brief historical review, the speaker, in answer to the question, which he propounded himself, "What we are coming to?" ventured into the dangerous field of prophecy, and predicted that the days of steam and of iron and steel are numbered, and that in the future solar heat will be the motor and aluminum the metal used in their places. After General Ellis' address, Mr. Thos. C. Clarke, of Philadelphia, was chosen Chairman of the Convention. In a few brief remarks, he welcomed the members to Philadelphia.

The first topic which came up for discussion was Mr. Charles Bender's paper on the "Theory of Continuous Girders in Relation to Economy in Bridge Building," which was presented to the Society some months ago. The discussion was opened by Mr. Clemens Herschel, who read a somewhat lengthy dissertation on Mr. Bender's paper. Mr. Shreve was called upon, but declined on the ground that he had not prepared for the discussion. So did the venerable Mr. Whipple, one of the fathers of American bridge building, and also Mr. Morison. Mr. Bender then replied to Mr. Herschel, and Prof. Dubois and the previous speaker had some animated discussion of the subject.

A very interesting paper was read by Mr. Petit, on the motives and reasons which governed the selection of the plans for the Centennial exhibition buildings. Mr. Schwartzmann, the architect of the memorial art building, and also of the horticultural hall, was then called upon, and made some remarks on the reasons which should control styles of architecture.

Mr. Bogart read a communication from members of the Austrian Society of Civil Engineers, announcing that their Association desired to present to the American Society of Civil Engineers a part of the models and drawings of engineering works executed in the Austrian department, which would be placed at the disposal of the American Society at the close of the Exhibition. A resolution accepting the donation with thanks was adopted.

Various announcements were made of arrangements for the entertainment of the members of the Society during their stay in Philadelphia. A reception was to be given them at the Union League Club, Tuesday evening, by the resident members in Philadelphia, and by Mr. Fairman Rogers, at his house, on Thursday evening. An excursion on the Delaware River was arranged by the American Dredging Company for Wednesday afternoon, and a joint meeting of the American Institute of Mining Engineers and of the Civil Engineers will be held in the hall of the Franklin Institute, June 20.

Altogether, the Eighth Annual Convention promises to be an agreeable one, but as with all other similar meetings held in Philadelphia this year, the allurements of the Centennial Exhibition will, it is feared, limit the amount of attention which the members of the Society will have left for the consideration of the subjects selected for discussion. It is not quite clear either how the requisite consideration can be given to the subjects, papers, reports, etc., which form the programme for the Convention. There are but two meetings for their discussion proposed, each of three hours' duration. There are, including the presiding officer's address, twenty-two papers and reports to be received or discussed, or both, so that the average time to be devoted to each would average a little more than sixteen minutes apiece. It should be observed that the sort of subjects to be considered in this time are such as "The Theory of Continuous Girders;" "Waves of Translation;" "The Improvement of the Mouth of the Mississippi;" "Levees as a System for Reclaiming Lands;" "Metric System of Weights and Measures;" "Railroad Accounts and Returns;" "Railway Signals;" "Technical Education;" and "The Resistance of Railway Trains."

Now either it is useless to prepare such a list of subjects for consideration, or else more time should be devoted to their consideration. A discussion of such a subject as those named of sixteen minutes' duration possibly might be valuable, but as a matter of fact it never is.

### Some Questions to Expert.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I was not aware of propounding any conundrum to "Expert." He does not, however, answer my questions as fully as I hoped

he would. He simply says: "She weighed about 18½ tons, was 14-inch cylinders." What stroke? What size of driving wheel? What lap and travel of valve? What size of fire-box, number and size of flues? Single or double dome, &c.? These points he did not think to answer; but they are quite important to know, at least before accepting an "Expert's" say so for it. Can he give me the loss of power by the use of the slide valve? Don't think he can. Also, while he has pencil in hand, please give me what the loss is by "heating steam too hot." This is something new to me. Getting steam too dry in our ordinary locomotive boilers! How many years has "Expert" handled locomotives? How many different builds of engines he must have handled to make such a statement! I agree with you, Mr. Editor, in your comments on "Expert's" communication. He flies the track very easily. Now what is the most astonishing is that he is confident, yes, positive, he can increase the power of a locomotive 20 per cent. for \$60. That is a capper. I will say, as I did in the 12th of May, namely: "I would like to hear from 'Expert' again on this subject." I might find him a hundred or two engines to reconstruct at his figures, providing they don't heat their steam too hot after the change."

I am of the same opinion as yourself, Mr. Editor, that if "Expert" gave us some idea of how to do this he is so very positive he could do if given a chance, rather than calling everybody fools or words to that effect, he would be more likely to find plenty of engines he could reconstruct, as per his statement, for \$60 per engine.

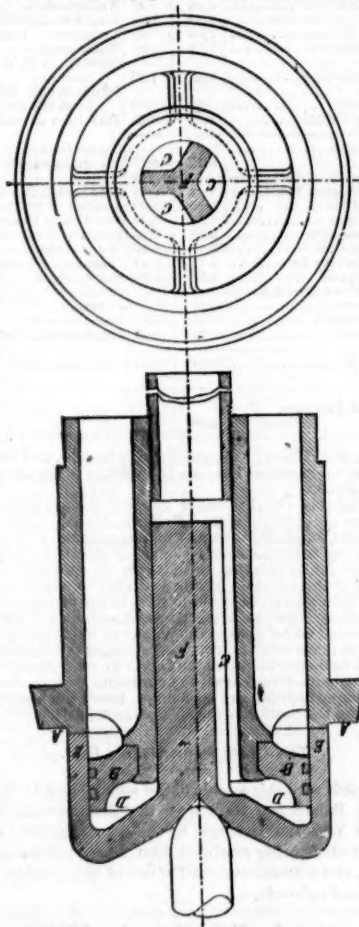
H. KINGSLAND, L. E.

### The Power of Locomotives.

YATES CITY, Ill., June 3, 1876.

TO THE EDITOR OF THE RAILROAD GAZETTE:

"Expert" says in your paper of the 2d inst. that the conun-



HUDSON'S IMPROVED SAFETY VALVE.

drums propelled by Mr. Kingsland, in your issue of May 12, are altogether too complex to be solved or explained in a newspaper article. Now, I do not agree with "Expert" in this respect. As I understand the matter, Mr. Kingsland, a locomotive engineer, asks an unknown individual, who pretends to be an expert in such matters, for his explanation of the cause of light locomotives being frequently much stronger in proportion than heavier ones. Now, I do not pretend to be an expert, or a practical locomotive engineer; but I will, nevertheless, at the risk of being considered presumptuous, give my explanation of the matter. The power of a locomotive engine consists of, 1, the power of traction, which is in proportion to the weight of that part of engine resting on the drive wheels, and 2, of the steam power, or those elements that would constitute horse power in a stationary steam engine. These terms should be equal, or, in other words, the traction should be equal to the steam pressure multiplied by the area of the pistons multiplied by the length of the crank and divided by the radius of the drive wheels. If the traction is not enough, the wheels will slip; and if it is more than is necessary, the surplus weight on the drive wheels only adds to the resistance or decreases the power.

W. H. ROBINSON.

### Effect of Grades and Curves on Wear of Rails.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The writer of this note, in endeavoring to look up information as to the effect of gradients and curvatures on the wear of rails, has been surprised at the paucity of published information on

the subject. If any of your readers have authentic records as to the following points, they would doubtless be of much interest and value to many of your readers:

1. Records extending over a period of years as to the comparative wear and renewals of rails on curves or sections containing heavy curvature, and on adjacent sections, straight or nearly so, and sustaining the same traffic and engine mileage.

2. Similar information as to the wear of rails on gradients and level or nearly level track; it being understood, of course, that the sections are contiguous to each other, so that the conditions of wear are the same in each case.

W.

### Hudson's Safety Valve.

When an ordinary safety valve opens and steam begins to escape, the pressure of the escaping steam inside of the opening of the valve becomes reduced, and the valve is liable either to close entirely or to remain open so small a distance as not to relieve the boiler pressure rapidly enough. The engraving represents a form of valve used extensively by Mr. Hudson, Superintendent of the Rogers Locomotive Works, and intended to overcome this difficulty.

The valve, *E E*, is of what might be called a cylindrical form, with a stem, *F*, shown in section in the plan, which extends down into a guide, *C*, which is attached by arms to the valve seat. To the top of this guide or central piece, a piston, *B*, is attached, which fits into the inside of the valve, *E E*. Owing to the form of the stem *F*, steam can pass up the tube *C* into the space *D D* above the piston and under the valve. When the steam pressure in *D D* becomes greater than the load on top the valve, the latter will be raised from the seat at *E E*, and steam will escape at *A A*. It will be observed, however, that there is no communication between the space *C C* inside the guide and *G G* on the outside. Therefore when steam escapes from the outside at *A A*, the pressure at *C* and consequently at *D D* is not diminished, excepting so far as the whole pressure in the boiler is diminished by the steam which escapes at *A A*. The valve will therefore remain open until the boiler pressure is reduced below that which will raise the valve. Owing to the escape of steam, the pressure at *G G* is diminished as soon as the valve is opened, whereas that at *D D* remains the same as the pressure in the boiler, whether the valve is opened or closed.

### Iron Cars and Car Frames in Europe.

A writer in the *Moniteur Industriel Belge* says:

At the origin of railroads on the Continent wood was used almost exclusively for the frames and bodies of cars. The timber for the framing and the joiner work of the bodies should be of very good quality. In spite of the strictness of the inspection of the wood on accepting it, it soon became evident that it suffered numerous injuries in service; that the paint or other coating could not protect the wood from the deterioration arising from the effect of the air-deterioration made more disastrous by the constant movement of the vehicles. This, however, is not the only nor the principal cause of their rapid deterioration: the cars were without buffers and elastic connections, and, although wood is elastic, shifting at the stations soon racked the frames, broke the buffer beams, and required frequent repairs. To avoid these causes of deterioration, the plan was made to isolate the car in a manner to protect it from shocks by the use of buffing and traction springs. As the sills bent, it was proposed to reinforce them with strong iron plates; finally the wooden sills were suppressed entirely to be replaced by plate iron 0.4 in. to 0.6 inch thick.

Thanks to the progress of metallurgy, which make it possible to offer special irons at reduced prices, the plate iron was replaced by rolled iron because of a profile offering greater stiffness and better fitted for the erection of the car. Thus it has been found advantageous to replace successively the wooden parts forming the frames by special irons. The wooden buffer beams which, on account of their elasticity, until recently still found partisans among engineers, have in their turn been replaced by iron beams. In fact, by the increase of traffic trains kept growing longer, and the leading cars had to undergo considerable shocks. To-day, the use of iron cross beams has become general; sometimes, however, a burring of wood is inserted of a length equal to the distance between the sills.

According to the statistics of the cost of maintaining rolling stock, cars entirely of wood of 22,000 lbs. capacity cost about \$22 (gold) for maintenance yearly, and their average life is about 16 years. We understand by average life the time at the end of which the vehicle has cost in expenses for repairs as much as its purchase price. This average life is applied to vehicles which are not destroyed by accidents, fire or other abnormal causes: in the latter cases the iron cars have the advantage, their wrecks being worth more than those of wooden cars.

The cost of maintenance of iron cars is very low; a coating of some protecting substance renewed yearly assures an almost indefinite life to the materials. The repairs other than those of the wheels, axles, springs—in a word, of the running gear and the draft apparatus—which are nearly the same as for wooden cars, are limited to the replacing of a few rivets, and a straightening of plates. Upon various Belgian lines where iron cars are used almost exclusively, especially for carrying coal, the average cost of maintenance is about 15 cents yearly.

The life of an iron car cannot be determined for lack of material, the first of those cars having been put into service only about 15 years ago. There exists, however, a covered car entirely of iron constructed thirty years ago, when the Belgian railroads began. It is still in perfect condition. However, no others were constructed on account of the inconveniences resulting in summer from the great heat in close cars of plate iron. This also was the opinion of the Technical Convention of the German Railroad Union held in Dresden in September, 1865. The question submitted to the engineers belonging to the Union was decided unfavorably to covered cars of iron, but favorably to frames entirely of iron. As to cars with raised sides [gondola cars, etc.] their use was not yet sufficiently extensive to justify a decision.

In Germany, where the use of cars wholly of iron for the transportation of merchandise is becoming general, the opinion is that since their employment the working expenses due to renewals and repairs have diminished, the safety is greater, the derailments less frequent, an account of the parallelism of the axles, which remains invariable. In Upper Silesia there were 1,200 cars in service wholly of iron in 1867, the first dating from 1861; in the Saarbrück roads there were about 1,000 at the same date. The former weigh about 12,100 lbs., the latter a little less.

The dead weight of these cars of 22,000 lbs. capacity is generally greater than that of wooden cars. In Belgium, where these cars weigh only 10,100 to 10,500 lbs., it is not so; this arises from the more skilful use of the material by the builders of this country.







**hansen, A. M. Casebolt, A. B. Dorman, Charles E. Rodney, Louis W. Miller.** The board met May 27 and elected Philip R. Van Frank President; Wm. B. Wilson, Vice-President; John Ivers, Secretary and Treasurer; Philip R. Van Frank, Wm. B. Wilson, Louis F. Clostermann, Executive Committee.

**Peoria, Pekin & Jacksonville.**—At the annual meeting in Peoria, Ill., June 8, the following directors were chosen: John Allen, Lucius Hopkins, James L. Constable, Edwin L. Trowbridge, Richard Arnold, James F. Kelsey. The board elected John Allen President; W. C. Phillips, Secretary.

**Flint & Pere Marquette.**—At the annual meeting in East Saginaw, Mich., June 7, the following directors were chosen, 25,000 shares being voted on: Wm. L. Webber, H. C. Potter, East Saginaw, Mich.; O. W. Potter, John H. Prentiss, Chicago; Philo Remington, Ilion, N. Y.; Wm. W. Crapo, Charles R. Tucker, Alexander H. Seabury, New Bedford, Mass.; Jesse Hoyt, New York. The new directors are Messrs. O. W. Potter, Seabury and Remington, who succeeded Samuel Farwell, deceased, W. J. Rotch and G. W. Ledlie. Mr. Potter is one of the executors of the Ward estate; Mr. Remington is the well known manufacturer of arms.

**New Brunswick.**—At the annual meeting in Fredericton, N. B., June 6, the following directors were chosen: Alex. Gibson, A. P. Randolph, Thos. Temple, Robert Robinson, E. R. Burpee, S. S. Hall, J. P. C. Burpee. The board re-elected Alexander Gibson President, and Julius L. Inches Secretary and Treasurer.

**Canada Southern.**—At the annual meeting in St. Thomas, Ont., June 7, the following directors were chosen: E. W. Vanderbilt, Augustus Schell, Samuel F. Barger, E. D. Worcester, Joseph Harker, W. L. Scott, Sidney Dillon, Adam Crooks, E. A. Wickes.

**Keokuk & Des Moines.**—At the annual meeting in Keokuk, Ia., June 6, the following directors, whose terms then expired, were re-elected for three years: Edward J. Mandell, J. Augustus Johnson, Robert C. Geor.

**Rome, Watertown & Ogdensburg.**—At the annual meeting in Watertown, N. Y., last week, the old board was re-elected as follows: Marcellus Massey, William C. Pierpont, Moses Taylor, Samuel Sloan, Theo. Irwin, T. H. Camp, C. Zabriske, D. H. Hungerford, Gardner Colby, John S. Farlow, William E. Dodge, William M. White, John T. Denny.

**Knightville & Chicago.**—The first board of directors of this new company is as follows: Joseph W. Collett, John Collett, W. K. Edwards, Samuel Groendyke, L. D. Thomas, Ensign Bennett, Wm. Watson, R. M. Hollingsworth, James T. Casle.

**Evansville, Terre Haute & Chicago.**—At the annual meeting in Terre Haute, Ind., June 6, the following directors were chosen: E. M. Benson, H. W. Beckwith, Joseph Collett, Jr., W. K. Edwards, W. R. McKee, J. E. Martin, Claude Matthews, C. Y. Patterson, Chauncey Rose. The board re-elected Joseph Collett, Jr., President and Superintendent; J. S. Hunt, Secretary; Joseph Collett, Treasurer.

**Terre Haute, Worthington & Bloomfield.**—Officers of this new company have been chosen as follows: President, S. Claypool, Indianapolis; Vice-President, R. N. Hudson, Terre Haute, Ind.; Secretary and Treasurer, George C. Dwy.

**Burlington, Keosauqua & Western.**—This company was organized at West Point, Ia., June 8, by the election of the following directors: G. L. Epps, Denmark, Ia.; J. B. Pease, Big Mound, Ia.; C. Baldwin, G. C. Duffield, Keosauqua, Ia.; John S. David, L. H. Dalhoff, James Morton, J. C. Power, D. N. Smith, Burlington, Ia.

**Columbus, Chicago & Indiana Central.**—At the annual meeting in Columbus, O., June 7, the following directors were chosen: B. E. Smith, William Dennison, C. Lumbus, O.; John Gard-er, Norwalk, O.; John B. Newman, J. N. Converse, Indianapolis; J. T. Thomas, Philadelphia; Adrien Iselin, William Whitworth, Jr., F. R. Fowler, Henry Morgan, John Bloodgood, A. W. Greenleaf, Alexander Taylor, Jr., J. Nelson Tappan, John B. Thompson, New York.

**Northern Pacific.**—Mr. George G. Sanborn is appointed General Agent, with office at St. Paul, Minn. Mr. Sanborn was until recently Superintendent of the Nashua, Acton & Boston road.

**East River Bridge.**—The trustees have re-elected Henry C. Murphy President, and Abram S. H. Witt Vice-President. Mr. Charles J. Canda has been appointed a trustee in place of F. B. Thurber, resigned.

## TRAFFIC AND EARNINGS.

### Petroleum Movement.

The Chesapeake & Ohio has succeeded in obtaining a considerable business in petroleum from Pittsburgh, which is carried down the Ohio to Huntington and delivered by the railroad at Richmond wharves. In four weeks from the first shipment 27,000 barrels went by this route. The higher ocean freights from Richmond makes the price of oil there about 1/2 cent lower than at other seaports, but this is more than made up by the difference in freights from Pittsburgh, as the tariffs now stand. With three feet of water a steamboat takes down 6,000 barrels and makes two trips a week, and the time from the Pittsburgh refinery to the vessel at Richmond is reported at four days.

The exports from the Atlantic ports for the five months from Jan. 1 to June 3 were, in gallons:

	1876.	1875.	1874.	1873.
New York.....	43,803,070	50,505,577	54,433,909	50,911,827
Boston.....	928,872	1,090,102	1,201,225	1,031,922
Philadelphia.....	23,167,001	14,873,142	28,655,115	26,484,723
Baltimore.....	15,830,572	10,339,629	1,898,885	1,121,768
Total.....	83,424,515	76,748,650	86,169,135	79,649,910

Compared with 1875, there is an increase of nearly 9 per cent. in the exports, but compared with 1874 there is a decrease of 3 1/2 per cent. Compared with 1874, New York's exports have fallen off nearly 20 per cent, and Philadelphia's 2 per cent., while Baltimore's have increased more than 700 per cent. Compared with last year, New York shows a decrease of 13 1/2 per cent., Philadelphia an increase of 55 per cent., and Baltimore an increase of 50 per cent.

### Ocean Rates.

From New York to Liverpool during the past week grain has been taken by steam at 8d. to 9d., closing at 9d.; by rail at 7 1/2d. per bushel; cotton by rail at 9-32d. per pound; provisions at 40s. to 45s. per ton, flour by rail at 2s. 6d. per barrel; to London, by rail, flour at 2s. 4 1/2d., and by steam, grain at 9 1/2d. and 10d., and flour at 3s. To Cork, for orders, sailing vessels were chartered at New York for grain at the rates of 9 1/2d., 9 3/4d. and 10d. per bushel of wheat; from Baltimore at 10 1/2d. and 10 3/4d.; from Philadelphia at 9 1/2d. Refined petroleum was taken from New York to Bristol at 4s. per barrel; from Philadelphia to Antwerp or Bremen at 4s.

### Passenger Rates.

The latest rates announced by the Erie points where it comes in competition with the New York Central took effect June 14 and are as follows: To Buffalo, Tonawanda, Niagara Falls or Suspension Bridge, 45c; excursion tickets, 90c; Dunkirk, 40c; Attica, Batavia, Le Roy, Caledonia or Rochester, 44.50c; excursion tickets, 88c. The company will also reduce the fares by its line to other cities on the New York Central Railroad as follows: To Utica, from 45c to 44c; to Syracuse, from 86.06 to 84c;

to Oswego, from 77.26 to 85c; to Auburn, from 86.58 to 84c; to Geneva, from 87.10 to 84c; to Canandaigua, from 87.54 to 84.50c. The same rates will be adopted for east-bound tickets.

### Railroad Earnings.

Earnings for various periods are reported as follows:

Year ending May 31:	1875-76.	1874-75.	Inc. or Dec.	P. c.
Boston & N. Y. Air Line.....	\$165,986	.....	.....	.....
Expenses.....	139,635	.....	.....	.....
Net earnings.....	\$27,351	.....	.....	.....
Earnings per mile.....	3,320	.....	.....	.....
Per cent. of expenses.....	77.49	.....	.....	.....
Ten months ending May 31:				
Boston, Revere Beach & Lynn.....	\$89,613	.....	.....	.....
Earnings per mile.....	8,961	.....	.....	.....
Five months ending May 31:				
Atchafson, Topeka & Santa Fe.....	\$352,834	\$468,754	Inc..	\$384,080 81.9
Atlantic & Pacific.....	504,608	465,651	Inc..	39,047 8.4
Canada Southern.....	721,873	421,350	Inc..	300,523 71.3
Central Pacific.....	6,262,000	6,171,813	Inc..	90,187 1.5
Chicago & Alton.....	1,794,431	1,730,733	Inc..	63,698 3.7
Chi., Mil. & St. Paul.....	3,063,185	2,650,273	Inc..	432,912 16.3
Flint & Pere Marquette.....	308,376	2,983,871	Inc..	50,546 16.6
Illinois Central.....	2,934,117	.....	.....	.....
Ind., Bloom. & Western.....	640,441	515,249	Inc..	125,192 24.3
Int. & Great Northern.....	504,869	514,722	Dec..	10,853 2.0
Michigan Central.....	2,932,314	2,710,591	Inc..	221,723 8.2
Missouri, Kan. & Texas.....	1,007,711	1,007,571	Inc..	17,141 1.8
Ohio & Mississippi.....	1,542,923	1,332,292	Inc..	210,631 15.8
Pacific of Missouri.....	1,448,802	1,173,719	Inc..	275,083 23.4
St. Louis, Alton & T. H. Bellefonte Line.....	196,894	241,771	Dec..	44,877 18.6
St. Louis, Iron Mountain & Southern.....	1,474,305	1,348,318	Inc..	125,987 9.3
St. Louis, Kansas City & Northern.....	1,271,565	1,057,009	Inc..	214,556 20.3
Tol., Peoria & Warsaw.....	557,437	351,452	Inc..	205,985 58.6
Four months ending April 30:				
Bur., Cedar Rapids & Minnesota.....	\$367,633	\$363,019	Inc..	\$24,614 6.8
Expenses.....	277,245	258,809	Inc..	18,436 7.1
Net earnings.....	\$110,388	\$104,210	Inc..	\$6,178 5.9
Per cent. of expenses.....	71.63	71.30	Dec..	0.23 0.3
Cleveland, Mt. Vernon & Delaware.....	117,093	124,938	Dec..	7,845 6.8
Expenses.....	90,925	90,417	Dec..	5,492 8.5
Net earnings.....	\$26,768	\$34,521	Dec..	\$17,747 4.9
Per cent. of expenses.....	77.25	79.53	Dec..	2.28 2.9
Michigan Central.....	2,302,966	2,163,802	Inc..	149,164 7.0
Expenses.....	1,618,477	.....	.....	.....
Net earnings.....	\$784,489	.....	.....	.....
Per cent. of expenses.....	48.93	.....	.....	.....
Hannibal & St. Joseph.....	621,987	\$497,436	Inc..	\$124,551 25.1
Houston & Texas Cent.....	981,392	805,139	Inc..	176,253 21.9
Missouri, Kan. & Texas.....	971,874	820,480	Inc..	151,394 18.5
Expenses.....	510,300	436,580	Inc..	73,720 16.9
Net earnings.....	\$461,574	\$388,900	Inc..	\$72,674 20.3
Per cent. of expenses.....	52.51	53.21	Dec..	0.71 1.3
Paducah & Memphis.....	76,740	62,867	Inc..	13,873 22.1
Expenses.....	48,718	47,443	Inc..	1,275 2.7
Net earnings.....	\$28,022	\$15,424	Inc..	\$12,598 81.8
Per cent. of expenses.....	63.48	78.43	Dec..	11.94 15.8
St. Louis, Iron Mountain & Southern.....	1,309,405	1,073,171	Inc..	236,234 12.7
Expenses.....	636,549	647,064	Dec..	21,115 3.3
Net earnings.....	\$672,856	\$426,097	Inc..	\$246,759 37.0
Per cent. of expenses.....	61.81	60.35	Dec..	8.54 14.2
St. Louis & Southeastern.....	329,087	340,458	Dec..	11,371 3.3
Expenses.....	290,806	298,465	Dec..	7,659 2.6
Net earnings.....	\$38,281	\$41,993	Dec..	\$3,712 8.8
Per cent. of expenses.....	88.36	85.16	Inc..	3.21 3.5
Month of April:				
Hannibal & St. Joseph.....	\$148,573	\$147,439	Inc..	\$1,134 0.8
Houston & Tex. Cent.....	194,983	165,087	Inc..	29,896 18.1
Month of May:				
Atchafson, Topeka & Santa Fe.....	\$212,083	\$106,482	Inc..	\$105,601 99.3
Atlantic & Pacific.....	99,601	93,895	Inc..	5,706 6.1
Canada Southern.....	123,088	102,546	Inc..	20,542 20.0
Central Pacific.....	1,700,000	1,798,468	Dec..	98,468 5.5
Chicago, Mil. & St. Paul.....	819,853	718,465	Inc..	101,388 14.1
Flint & Pere Marquette.....	301,162	89,719	Inc..	1,449 1.6
Illinois Central.....	585,969	604,881	Dec..	18,912 3.1
Ind., Bloom. & Western.....	130,585	89,694	Dec..	40,891 45.6
Int. & Great Northern.....	72,887	81,905	Dec..	8,708 10.7
Michigan Central.....	629,344	556,789	Inc..	72,559 13.0
Missouri, Kan. & Texas.....	212,928	187,091	Inc..	25,837 13.8
Ohio & Mississippi.....	313,070	257,071	Inc..	55,999 21.4
Pacific of Missouri.....	264,847	222,331	Inc..	42,516 19.1
St. Louis, Alton & T. H. Bellefonte Line.....	38,920	39,039	Dec..	119 0.3
St. Louis, Iron Mountain & Southern.....	264,900	275,147	Dec..	10,247 3.4
St. Louis, Kansas City & Northern.....	237,355	188,083	Inc..	49,272 20.3
Tol., Peoria & Warsaw.....	125,209	70,992	Inc..	54,017 77.4
First week in June:				
Atchafson, Topeka & S. F.....	\$44,644	\$21,072	Inc..	\$22,972 105.9
Michigan Central.....	135,482	114,997	Inc..	20,485 17.8
Ohio & Mississippi.....	75,790	64,625	Inc..	11,165 19.0

Central Pacific earnings are compared with 1874 as follows:

	1876.	1875.	Increase.	P. c.
May.....	\$1,700,000	\$1,311,098	\$388,902	29.6
Five months.....	6,262,000	4,987,348	1,274,652	26.3

### Employing Idle Steam Colliers.

The Philadelphia & Reading Coal and Iron Company took contracts for 5,000 tons of rails of the 12,000 recently bargained for by the Texas & Pacific, part to be made by itself and part by other iron works on the line of the road. It is to be delivered at Houston, Tex., and for that purpose the railroad companies' steam colliers will be employed, the coal traffic being too light to keep them busy.

### Lake and Canal Rates.

For two weeks the quoted rate for wheat from Chicago to Buffalo was 2 1/2 cents, with most contracts on "private terms," until Tuesday, the 13th, when, according to telegrams, 8 cents was received for wheat and 2 1/2 for corn, the corn rate before having been 2 1/2 cents. Canal rates on wheat from Buffalo to New York were given as 6 1/2 cents per bushel since our last issue until this same Tuesday, when they fell to 6 and 6 1/2 cents. What the lake vessels gained, therefore, the canal boats lost. Coal from Buffalo to Chicago is taken for 40 cents a ton, or thereabout.

### Grain Movement.

For the week ending May 27 receipts and shipments of grain of all kinds, in bushels, were:

	1876.	1875.	Increase.	P. c.
Lake ports' receipts.....	3,285,724	2,765,792	519,932	19.0
" " shipments.....	3,467,864	2,792,498	675,366	28.2
Atlantic ports' receipts.....	5,516,566	2,661,075	2,855,491	99.8

Compared with previous weeks, lake ports' receipts show a large increase, for the first time since the opening of navigation being nearly as great as the shipments. The shipments

are about the same as for the previous week (a trifle less), and somewhat less than for the other weeks since the opening of navigation.

At the close of this week the shipments of Northwestern markets for the calendar year at last exceeded the hitherto unprecedented movement of 1874, when a great foreign demand, an enormous surplus here, and the prevailing desire to realize money so soon after the panic combined to stimulate the movement.

Of the shipments from Northwestern markets for the week ending May 27 51 per cent. went by rail in 1876, against 36 1/2 per cent. in 1875 and 26 per cent. in 1874.

Chicago receipts and shipments for the week ending June 3 were:

	1876.	1875.	Increase.	P. c.
Receipts.....	3,061,714	1,171,314	1,890,500	161.5
Shipments.....	2,542,850	1,748,647	794,203	45.4

Hence the receipts have at last not only equaled the shipments, but greatly surpassed them, though the shipments were greater than for any previous week of the season. The receipts are greater than for any two previous weeks.

For the week ending June 3 the receipts and shipments of grain of all kinds are reported as follows, in bushels:

	1876.	1875.	Increase.	P. c.
Lake ports' receipts.....	5,936,853	2,641,087	3,295,766	125.2
" " shipments.....	4,210,064	2,769,906	1,440,158	51.9
Atlantic ports' receipts.....	5,664,833	3,535,413	2,129,420	60.3

Of the shipments during the week, 43 1/2 per cent. was by rail in 1876, against 39 per cent. in 1875 and 26 per cent. in 1874. The proportion is smaller than for previous weeks this year, but the quantity not much less. There has been a very large increase in water shipments and a little decrease in rail shipments.

For the five months from Jan. 1 to June 3 receipts and shipments have been, in barrels and grain in bushels:

	1876.	1875.	Increase.	P. c.
Flour.....	2,155,160	1,909,870	245,290	12.8
Lake ports' receipts.....	2,917,311	2,507,536	409,775	16.4
Atlantic ports' receipts.....	3,707,765	3,685,914	22,851	0.6

Wheat:

	1876.	1875.	Increase.	P. c.
Lake ports' receipts.....	16,056,088	18,258,528	2,202,440	12.1
" " shipments.....	15,938,326	11,799,652	4,138,674	35.1
Atlantic ports' receipts.....	14,764,734	11,321,883	3,442,851	30.1

Corn:

	1876.	1875.	Increase.	P. c.
Lake ports' receipts.....	27,296,951	10,311,831	16,985,120	42.1
" " shipments.....	23,329,003	12,461,307	10,867,696	87.3
Atlantic ports' receipts.....	32,882,239	22,896,642	9,985,597	43.6

Grain of All Kinds:

	1876.	1875.	Increase.	P. c.
Lake ports' receipts.....	65,628,548	47,210,000	18,418,548	17.6
" " shipments.....	47,437,063	30,607,467	16,829,596	55.0
Atlantic ports' receipts.....	58,020,017	41,374,920	16,645,097	40.2

Further comparison of this year's movement with that of 1874 and 1875 is as follows, the totals of grain of all kinds being given:

Chicago receipts and shipments of grain of all kinds for the				
week ending June 10 were, in bushels:				
	1876.	1875.	Increase.	P.
Receipts.....	3 634 791	802 400	2 732 392	302





Published Every Saturday.

CONDUCTED BY

S. WRIGHT DUNNING AND M. N. FORNEY.

## CONTENTS.

ILLUSTRATIONS:	Page.	EDITORIAL NOTES:	Page.
Mogul Engine for the Don	261	MISCELLANEOUS:	267
Pedro Segundo Railroad	261	Iron Cars and Car Frames in	263
Hudson's Improved Safety	263	Europe	263
Valve	263	On Railroad Accounts and	264
CONTRIBUTIONS:		Returns	264
Eighth Annual Convention of		The Great Pennsylvania Run	264
the American Society of		NEW PUBLICATIONS:	268
Civil Engineers	263	The United States Interna-	268
The Power of Locomotives	263	tional Exhibition	268
Effect of Grades and Curves		GENERAL RAILROAD NEWS:	
on the Wear of Rails	263	Master Car Builders' Associa-	
EDITORIALS:		tion—Tenth Annual Con-	
Passenger Traffic	266	vention	261
Earnings and Expenses in		Master Mechanics' Associa-	
1875	266	tion—Ninth Annual Con-	
Ocean and Rail Rates	267	vention	272
The New York Elevated Rail-		Elections and Appointments	264
road	267	Traffic and Earnings	265
Grain Receipts at Atlantic		Personal	269
Ports	267	The Scrap Heap	269
Record of New Railroad Con-		Old and New Roads	269
struction	267	Annual Reports	271

## Editorial Announcements.

**Passes.**—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

**Addresses.**—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

## PASSENGER TRAFFIC.

Passenger rates, as well as freight rates, suffer more this year than last by the railroad war, and the changes in them are more numerous. Last year the rates after the first "break" were \$18 from New York to Chicago and \$15 from Chicago to New York. This year, substantially, the first reduction was from the regular \$22 rate from New York to Chicago to \$15; then June 10 this was reduced to \$14, and on Monday the 12th to \$13, the latter being, we believe, the lowest rate ever known. The east-bound rates have followed the west-bound very closely—within a day or two in every case we believe. There is this to be said of the low passenger rates, that, unlike the low freight rates, they largely increase the gross amount of traffic; and they will probably be especially efficacious this year, when everybody wishes to visit Philadelphia, and not everybody could afford to pay \$33 for fares who can afford to pay \$26, the reduction from the Centennial round-trip rates being about in that proportion for through limited tickets. The average rate per passenger per mile by the shortest route from New York to Chicago is now 1.43 cents. The average reported expense on the Pennsylvania last year was 1.669 cents; on the Erie, 1.951 cents; on the New York Central & Hudson River, 1.277 cents; on the Lake Shore, 1.737 cents; on the Michigan Central, 1.60 cents. The cost reported from the New York Central is probably too small, for the same reason that the reported average expense per ton of freight per mile on that route (0.759) is too large, namely, that the expenses are assumed to be in the same proportion to both passenger and freight receipts, while probably a larger proportion of the receipt is required for expenses in the case of passengers and a smaller one in the case of freight. In the case of the Pennsylvania, for instance, the freight expenses are 58½ per cent. of the receipts; the passenger expenses, 71 per cent.

Through passenger traffic, however, is probably on the average more costly even than local. The cars may be better filled (though this is not always the case), but a very large proportion of the through passengers are carried in sleeping and parlor cars, having about half the actual capacity of ordinary first-class coaches and weighing at least one-half more. The sleeping car with a passenger to every berth has about a ton of dead weight per

passenger; the ordinary first-class coach with every seat occupied has less than one-third of a ton of dead weight per passenger. Moreover, the through train usually runs much faster than the local, with consequent greater damage to road and rolling stock. In the case of local freight hauled short distances, the terminal expenses largely increase the average expense per mile; but these terminal expenses hardly count with the passenger traffic.

The chief opportunity for reducing passenger expenses with increased travel is in getting larger average train loads. Several of the trains on our main lines now are as large, one might think, as could be taken with one engine; but we do not know that any extra passenger trains were put on last year to accommodate the great increase of through travel caused by the low rates then prevailing; and some trains were hauled then as long as respectable freight trains.

In analyzing railroad reports recently we have frequently taken occasion to present the average train-load, both freight and passenger. The smallness of the latter, when compared with the engine capacity, is astonishing. Very seldom is the average passenger-train load much more than 60, or a few more than a single car will seat. Evidently a very great economy would result from a policy which would secure something like a full train-load. A train carrying four or five hundred passengers from St. Louis to Philadelphia and back would not cost much more than one with an average load of one hundred.

The chief examples that have come to our knowledge of successful efforts to secure full train-loads and the consequent small average expense have been the excursions which for a few years past have been very common on some Western railroads. Many of these have been private enterprises, individuals engaging a train at a definite sum, or at a fixed price per car in addition to a definite sum, to start from certain stations and return on a given day or days. The manager of the excursion then makes rates to suit himself, does his own advertising, and of course aims to attract the largest train-load possible. All must go by the same train and all return by it; and the result is that usually every seat is occupied both ways. More than a thousand passengers have been taken on such an excursion; and we can allow very high expenses per train mile and yet bring down the average cost per passenger per mile by such a train to a very trifling sum.

To secure these large and full trains and the low cost per passenger it is necessary to restrict the accommodations, or rather the privileges, of the passenger. He must go and return on the specified train, cannot "stop over," and must limit his stay at the place of destination to the time fixed beforehand. But in return it is possible to give him a very cheap rate, such as cannot possibly be afforded otherwise.

It seems to us that the Centennial affords an occasion for the organization of excursions of this kind in great number and on a very large scale. They need not be private enterprises, for nothing hinders their conduct by the railroad companies directly. Let it be announced that on some given day a month ahead an excursion train will take passengers from some half-dozen stations on a Northwestern railroad at a very low rate, to arrive at Philadelphia on a given day and to start back one week later, the tickets being good on no other train, and it is reasonable to believe that a train-load of 500 passengers could be secured, with not half-a-dozen empty seats, and that the cost per passenger would not be one-fourth of the average cost. It is true that Northwestern people when they go to Philadelphia usually wish to visit other parts of the East, where most of them have relatives; but these people cannot get all they want without a great increase of the expenses of the carrier, except so far as they can secure it within the dates fixed for the arrival and departure of the excursion train at Philadelphia, which may be a month as well as a week, if with such an interval a train-load of passengers can be secured.

The objection will be raised to such a plan that it would lessen the demand for ordinary Centennial and other tickets. This is true, but it is also true that it would probably enormously increase Centennial traffic, and what is more to the purpose, it would very greatly decrease expenses, and probably leave a reasonable margin of profit with a very low price. This is hardly the case with the Centennial tickets now issued. The passengers probably cost all or nearly all they pay, and there are absolutely no limitations which reduce expenses. It seems to us that our passenger men have hardly paid sufficient attention to this side of their business. We have in this country provided many accommodations which hardly exist elsewhere. Cars have been made more and more costly, and a great deal of ingenuity has been expended in efforts to surpass all rivals in the attractions offered. The result has been an increase in passenger expenses, but, apparently, little increase in traffic. Our great railroads have no more passengers and no greater passenger earnings than they had ten years ago, and probably smaller

passenger profits. Instead of aiming to give greater accommodations for the full price to those who can afford to pay it, suppose an attempt be made to supply sufficient accommodations at a lower cost and lower price to those who cannot afford to pay the present moderate ordinary first-class rate. Passenger traffic is almost infinitely elastic. If the rate on wheat from St. Paul to New York were reduced to one cent a bushel, hardly a train load more would go to the sea-board this season; but if the passenger rate were reduced to a dollar, all Minnesota would make the journey. It is not possible to afford lower rates unless expenses are reduced, however. Very determined efforts have been made to reduce the expenses attending the traffic as it exists; but we think there is reason to believe that modifications of the ordinary traffic might be introduced which would increase receipts without a corresponding increase in expenses. These modifications (in these times at least) cannot be in the directions of greater accommodations at a greater price, but must be such as will permit reductions in prices through reductions in expenses. One of the most obvious means of reducing expenses on additions to traffic is the securing of large and full train loads.

It is perhaps hardly the time to suggest excursions at reduced rates when the ordinary price of a ticket between Chicago and New York is thirteen dollars; for doubtless the excursions would be more successful when such a ticket costs twenty-two dollars. But the excursion rates, at any rate, would have to be compared with the reduced Centennial rate, and the merit of the proposition, if it has any, is in the reduction of expenses aimed at.

## Earnings and Expenses in 1875.

We publish this week a table giving the mileage, gross and net earnings, percentage of working expenses and gross and net earnings per mile of all the railroads whose reports for the calendar year 1875 we have received. The statements for the several roads have been published separately as the reports were made, and the chief value of the consolidated statement is to indicate the aggregate result of the year's railroad business. The whole number of companies reporting is 64, with an aggregate of 19,862 miles of railroad, which is about 27½ per cent. of the entire mileage worked during the year, and the largest ever reported together from a single fiscal year. Of course only those are included which make reports for the calendar year, and as most companies' fiscal years do not correspond with the calendar year, it is impossible to embody the reports of all companies in this statement, which serves chiefly to illustrate the results of operations during the particular year in question. The tables of the next issue of Poor's Manual, soon to appear, will cover nearly the whole mileage worked in the country, but the reports will be for various years, some ending more than a year ago, some but just closed.

The table contains very few New England roads, those mostly reporting for the year ending with September, as do most of the New York roads. Of lines east of Ohio and north of the Potomac there are about 4,200 miles; of those further west, north of the Ohio and not further south than Missouri and Kansas, there are about 13,500 miles; of Southern roads the mileage is about 1,900 miles.

The roads reporting had 491 miles, or about 2½ per cent., more road in 1875 than in 1874. Their gross earnings were less by nearly nine millions of dollars, or about 5 per cent.; their net earnings less by four and a half millions, or nearly 7 per cent. Per mile of road there was a reduction of \$675, or 7.3 per cent., in gross earnings, and of \$317, or 9 per cent., in net earnings. Summarized, the aggregate results may be stated as follows:

	1875.	1874.	Decrease.	P. c.
Total mileage	19,862	19,371	491	2.5
Gross receipts	\$170,193,959	\$179,070,038	\$8,876,079	4.98
Working expenses	107,355,798	111,645,820	4,290,022	3.85
Net earnings	\$62,838,161	\$67,424,218	\$4,586,057	6.80
Per cent. of expenses	63.08	62.35	0.73	1.16
Gross earnings per mile	\$8,599	\$9,244	\$675	7.30
Expenses per mile	5,405	5,763	358	6.21
Net earnings per mile	3,164	3,481	317	9.11

Last year we published a similar table including 59 railroads with 17,684 miles of road, for the years 1874 and 1873. The result then shown was remarkable, for while earnings had decreased nearly as much as they did the following year, the decrease in working expenses was so much greater that there was absolutely an increase in net earnings, amounting to no less than 7½ per cent. This year, on the other hand, we have a decrease of 9 per cent.

At that time we ventured to say that further rapid progress in reducing expenses was not to be expected, in these words: "Though efforts at economy are probably quite as earnest and as general this year as last, that as much can be effected by them as was done last year is not to be expected. Wages and materials reached their minimum, very nearly at least, before the end of last year." There has been since that time a further decrease in prices, but reductions of rates have been probably at least as great, and the hope of increased profits now depends on the prospect for increased traffic. Certain kinds of traffic are heavy now, though not the profitable kinds; the traffic of last winter was quite good; that after midsummer de-



pends to so great an extent on crops yet to be grown, not to say harvested, that it would be bold to venture a guess concerning it. The one thing certain is that there is now abundant room for improvement.

#### Ocean and Rail Rates.

Not the least noticeable phenomenon in connection with the great grain movement since the rail rate from Chicago to New York was reduced to 20 cents per hundred is the increase in ocean freight rates. Lake and canal rates have been brought down to a minimum. The difference between prices in the Northwest and at the sea-board has been correspondingly reduced. The American consumer has had some advantage in reduced prices of Western grain; the producer, as we showed a few weeks ago, getting about the same for his wheat as when the rate from Chicago to the East was 75 per cent. higher; but it seems that it is the carrier to Europe rather than the consumer there who profits by this reduction on the grain exported. At the time when the Chicago-New York rate was 18 or 21 cents a bushel on wheat, about the middle of April, it was carried from New York to Liverpool for about 9 cents, gold, or about 10 cents currency; since the Chicago-New York rate has been 12 cents a bushel, the New York-Liverpool rate has been 1½ to 21 cents currency, and most of the time not less than 18 cents. At this time a shipment made from Chicago to Liverpool costs about 32 cents per bushel currency for transportation. Early in April it cost not more than 31 cents. Now, 12 cents brings it by rail to the seaboard and the charge thence to Liverpool is 21 cents; then, the ocean vessel accepted 9 or 10 cents, and the railroad took 21 cents. Thus, so far as exported grain is concerned, neither producer nor consumer seems to profit by the reduction in rail rates. The cost of transportation from the Northwest to Liverpool has hardly been affected by it. What the railroads and the lake and canal boats have lost the ocean vessels have gained.

The following table gives the rate in cents per bushel by rail from Chicago to New York, the ocean rate from New York to Liverpool, and the price of No. 2 Milwaukee spring wheat in New York at intervals of a week from March to date:

	Rail rate.	Ocean rate.	Price of wheat.
April 6.....	24 cents.	10 cents.	\$1.38
" 13.....	21 "	9 "	1.37
" 20.....	15 "	9½ @ 10 "	1.36
" 27.....	12 "	13½ "	1.36
May 4.....	12 "	17 @ 18 "	1.19
" 11.....	12 "	17 @ 18 "	1.21
" 18.....	12 "	19 @ 20 "	1.25
" 25.....	12 "	16 @ 16 "	1.25
June 1.....	12 "	20 @ 21 "	1.23
" 8.....	12 "	20 @ 21 "	1.20½

If we add the ocean rate to the New York price, we have \$1.38 as the cost of a bushel of No. 2 Milwaukee spring wheat in Liverpool April 6 against \$1.40 to \$1.41½ June 8, and the greatest fluctuations have been from \$1.35½ to \$1.36 April 20 to \$1.44 to \$1.45 May 18.

The table shows that the ocean rate doubled within four weeks of the time that rail rates were reduced. They are now high at a time when a similar service in similar vessels on the Great Lakes is lower than ever before. Ships receive 2½ cents a bushel for carrying a bushel of wheat nearly a thousand miles from Chicago to Buffalo, while other ships receive seven or eight times as much for carrying the same grain only about three times as far. The ocean vessels sail the year round; the lake vessels are laid up five months out of the twelve. Very little change is necessary to make the lake sailing craft seaworthy; and the additions to the crew required are not considerable. Yet here we see the ships on salt water doing a thriving business while those on fresh hardly pay expenses.

#### The New York Elevated Railroad.

The New York Elevated Railroad began running trains by a new schedule Monday last, having more trains and quicker time than heretofore. The old schedule, which went into force Jan. 18, provided for forty trains, whose running time was for the most part 35 minutes from the Battery up to Fifty-ninth street (a little more than 4½ miles), and back (down grade), 34 minutes. By the new schedule there are 52 trains daily, the up trains making the trip in 27 to 30 minutes (mostly 30 minutes in the forenoon and 28 in the afternoon), while the down trains make it in 27 to 30 minutes, nearly all in the morning requiring but 27 minutes, and most of the trains in the afternoon 29 minutes. The speed of the fastest trains is thus about 10¼ miles an hour, including stops, of which there are no less than twelve in the 4½ miles. This is not fast running, perhaps; but it is fast under the circumstances—very light engines, a single track, numerous trains and some very sharp curves. The average speed on the London underground roads, with stops no more numerous, everywhere a double track, and locomotives weighing 50 tons against the 6-ton engines of the New York road, is but 15 miles per hour.

The addition to the number of trains by the new schedule is made without any addition to rolling stock. The trains simply run faster, and so are able to run more frequently. The company has for some time had two new engines considerably heavier than its old ones; but it does not use them as yet. With them, doubtless, better time could be made. The speed, however, in quite satisfactory with the road of its present length. If it was extended four or five miles northward on the

west side of Central Park, it would doubtless be desirable to make better time; but New York men who have been in the habit of being shaken in an omnibus or packed in a street car for an hour from Wall street to the vicinity of the Park feel very well satisfied just now to be able to ride comfortably in twenty-five minutes.

It had been the intention of the company on the completion of the several sections of the second track which they had well advanced a few weeks ago to nearly double the number of trains; but the completion of these has been delayed by injunctions, and the present schedule is apparently an attempt to do the best possible with the structure as it is. Trains now run every 15 minutes from 7 o'clock in the morning until 6:38 at night—which is pretty severe work for a single-track road. The increase in speed seems due largely to quicker stops at stations, by the free use of the vacuum brake used on this road (Steger's), and to shorter halts at stations. With the old schedule the stops were often less than half a minute; now passengers are adjured to "step lively," and the length of the stop must be counted in seconds where there are few passengers to get on or off. Here the disadvantages of our American cars, with entrances only at the ends, become manifest. Could the departing passengers get out at one side, as from open street cars, and those arriving enter at the other, a whole train could be loaded and discharged in a very few seconds. The surprising thing now, however, is that so very little time is absorbed by halts—probably not five minutes, perhaps not three, on the average in the entire trip with twelve stops to make, except when a train is waited for at the sidings where up and down trains meet.\*

The working of this road so far has certainly been very successful, in the quality of the work done. The trains are almost always on time, and so far there have been very few accidents or complications causing delays, and none resulting in anything more serious. Without more frequent trains, it is hardly possible to say whether the road will attract traffic enough to make it fairly profitable in its situation, a little to the west of the bulk of the city population; but the managers evidently have faith in it, and the second tracks they have begun, and whose completion is for the present prevented by injunctions, would make it possible to test this question pretty well. So far as the city at large is concerned, it is unquestionably a misfortune that the work of the construction was interrupted. The city needs to have the capacity and the defects of the existing road thoroughly demonstrated by experience, and the road has been so far successful in what we may properly call its incomplete state as to justify the hope that it will, if given a chance, prove at least a partial solution of the rapid transit problem.

#### Grain Receipts at Atlantic Ports.

An examination of the grain receipts at the different Atlantic ports shows that the New York and Philadelphia, and New York especially, have had the benefit of most of the increase since rates were reduced and navigation opened. Baltimore received just about as much in the first week in March as in the last week of May. For the five weeks ending April 1, the receipts there were 3,246,324 bushels; for the five weeks ending June 3, 3,094,725 bushels. In New York for the same periods the receipts were 3,497,970 and 10,619,198, respectively; in Philadelphia they were 2,399,775 and 4,318,600. The New York receipts increased 227 per cent., the Philadelphia receipts, 80 per cent.; the Baltimore receipts fell off about 4½ per cent. The course of these receipts is especially interesting because the cause of the railroad war, or a chief cause, was the belief of New York Railroad managers that Baltimore was diverting the New York traffic. During the winter the difference in rates in favor of Baltimore was 5½ and 5 cents per hundred—one-eighth—besides the drawback of 2½ cents on export grain. The same proportion of difference in rate is maintained now, it is said, but the difference between an eighth of 40 or 45 and an eighth of 20 is quite appreciable to the grain exporter. New York railroad managers, however, assert that it was not the agreed difference of rates which gave Baltimore so much grain in the winter, but still greater discriminations made by the Baltimore & Ohio company notwithstanding the agreement to maintain rates, and some believe this who did not when the railroad war broke out, they maintaining then that the Baltimore & Ohio had given no sufficient occasion for the dissolution of the combination by the action of the New York Central. However this may be, the course of traffic since that event indicates that the existing differences in rates, amounting to 2½ cents a hundred or 1½ cents a bushel on wheat from Chicago to Baltimore, and a drawback of as much more on grain exported, are not sufficient to attract grain from the other ports. The Baltimore receipts continue large, but no larger than when the rate to that port was 35 or 40 cents per hundred, instead of 17½, as it now is.

The largest receipts at Baltimore since February were for the week ending May 27, but those for the week ending March 18 were nearly as great. The largest receipts at Philadelphia were those for the last week reported—that ending June 2, when they were a third greater than for any week in March or April. New York's receipts for the same week were about as great as for any four weeks in March or April, four times as great as any week's receipts in Baltimore and nearly three times the greatest week's receipts in Philadelphia.

\*A train, taken at random, timed last Wednesday morning, made the following halts below Thirty-fourth street:

Station.	Length of halt.
Thirtieth street.....	10 seconds.
Twenty-first ".....	13 "
Fourteenth ".....	9 "
Houston ".....	9 "
Canal ".....	10 "
Franklin ".....	9 "
Warren ".....	14 "
Liberty ".....	24 "

Total of nine halts.....106 seconds.  
The cars were nearly full before reaching Canal street.  
At this rate, the time required for stops in the entire trip would be 2 minutes 21½ seconds.

The receipts of both Baltimore and Philadelphia continue to be chiefly corn. During the last five weeks 85 per cent. of Baltimore's and 71 per cent. of Philadelphia's were of this grain, either of them getting nearly as much as New York. During the winter, however, and even in March, Baltimore received much more corn than New York.

The other ports do not make much of a figure in grain this season.

For the six weeks since April 22 the receipts of grain of all kinds at each of the Atlantic ports have been:

	Bushels.	Per cent. of total.
New York.....	11,758,112	47.4
Boston.....	1,725,979	7.0
Portland.....	267,860	1.1
Montreal.....	1,674,069	6.7
Philadelphia.....	5,081,190	20.5
Baltimore.....	3,582,725	14.4
New Orleans.....	709,002	2.9
Total.....	24,797,677	100.0

Montreal, however, did not become accessible until late in the season. For the last week of the six its proportion of the total receipts was as much as 8 per cent., the total receipts being extraordinarily large. During that week, of the other 92 per cent., no less than 54 per cent. went to New York, 18½ per cent. to Philadelphia, and 12½ per cent. to Baltimore.

#### Record of New Railroad Construction.

This number of the *Railroad Gazette* has information of the laying of track on new railroads as follows:

*St. Louis, Kansas City & Northern.*—Track is laid on a new line from Ferguson, Mo., to the Union Depot in St. Louis, 11½ miles.

*Wyandotte, Kansas City & Northwestern.*—Extended from Wellington, Mo., east 5 miles. It is of 3-foot gauge.

*Texas & New Orleans.*—Track extended west 24 miles to a point 34 miles from Beaumont, Tex.

*San Francisco & North Pacific.*—The *Guerneville Branch* has been completed by laying 10½ miles of track to Guerneville, Cal.

*Southern Pacific.*—The *Tulare Division* is extended southward 9 miles to Keene, Cal., at the summit of the Tehachapi Pass. The *Los Angeles Division* is extended southward 16 miles to a point 150 miles east by south from Los Angeles.

This is a total of 76 miles of new railroad, making 628 miles completed in the United States in 1876, against 296 miles reported for the same period in 1875, 537 in 1874, and 1,181 in 1873.

NEW YORK PETROLEUM EXPORTS seem to be losing their comparative importance. Reports for the first five months of the year show that of the exports by the Atlantic, 64 per cent. was shipped from New York in 1873, 63 per cent. in 1874, 65 per cent. in 1875, but only 52½ per cent. in 1876. Baltimore seems to have made the diversion, its petroleum traffic having been created almost since 1874, when for the five months in question they were but 2 1-6 per cent. of the whole, rising to 13½ per cent. in 1875 and to 18½ per cent. this year. Last year Baltimore's gains were chiefly at the expense of Philadelphia. This year Philadelphia has almost recovered its position while Baltimore was gaining at the same time, both at the expense of New York. The beginning of shipments in large quantities by way of Richmond is chronicled, and it is not impossible that the new route may introduce competition for a traffic which has heretofore usually yielded fairly remunerative rates when nearly all other through traffic was unprofitable. It is a material which can well afford to pay such rates, and so long as no discrimination is made, reductions are not likely to be called for either by consumers or producers.

CHICAGO has nothing to complain of now in the way of diversion of business by the low rates. Last week it received more than 3,600,000 bushels of grain of all kinds—more than its receipts for the six weeks before rates were reduced. Its proportion of the total receipts is also larger than before. During the six weeks in March and April just mentioned the Chicago receipts were 23 to 32 per cent. of the total receipts at lake ports, St. Louis and Peoria. But for the five weeks last reported its receipts have been 42 to 51½ per cent. of the total, and the proportion as well as the amount increases. Until recently its shipments were larger than its receipts, and at one time much larger, and stocks seemed likely to become exhausted. But for the last two weeks reported the receipts are nearly a million bushels in excess of the shipments.

THE CHICAGO & NORTHWESTERN RAILWAY claims the prize for fast time in the Jarrett & Palmer special run from New York to San Francisco. The 492 miles between Chicago and Omaha were made in three minutes less than 11 hours, or at the average rate of 45 miles an hour, nearly. From Chicago to the Mississippi River, 138 miles, the average speed was 55.24 miles per hour. Between stations, one run of 63.3 miles was made at the rate of 62 miles an hour, and one of 7½ miles at 64 miles.

WEST-BOUND FREIGHT RATES at last share the fate of other through rates, passenger and freight, on through business between the East and West. Monday the rate on the three higher classes was made 25 cents per hundred from New York to Chicago, Cincinnati, Columbus and Indianapolis, and 16 cents on fourth class and special. The latter is at the rate of 0.34 cent. per ton per mile by the shortest route. As rates have not been maintained for some time, the reduction is not so great as it appears.

THE WEAR OF RAILS ON GRADES AND CURVES is the subject of an inquiry by a correspondent, whose investigations, we may add, will probably result in a published paper, so that whatever contributions of information may be made to him will be useful to the public. Any such contributions, whether intended for publication or not, and however slight, may be sent to this office for our correspondent.



## THE UNITED STATES INTERNATIONAL EXHIBITION.

IV.  
CAR WHEELS—CONTINUED.

In noting last week a tendency to indulge in chromo-engineering on the part of some of the manufacturers of car wheels, it was not intended to suggest even an inference that such indulgence in the luxury of color detracted from the quality of the objects exhibited. It was referred to simply as a question of taste, and it was considered quite legitimate to laugh at some of the exhibitors on this ground alone.

In doing this, as often happens when people laugh instead of speaking seriously, justice was not done to some, especially in the case of the Cayuta Wheel and Foundry Company, whose display of wheels was first described. This company has in its space a number of very excellent specimens of wheels, which were sent to the Centennial just as they came from the foundry. It is, of course, very difficult to form an opinion which is worth anything of their quality by simply looking at them; and notwithstanding the fact that this company has been making wheels for several years, it is still in somewhat the same condition as the Western town, which was so healthy that the inhabitants were obliged to borrow a corpse to start a graveyard: so the Cayuta wheels have not yet had time to show how long they will run. For this reason the company is unable to give reports of the mileage of wheels manufactured at its works.

## THE BARNUM RICHARDSON COMPANY.

This company, of Salisbury, Conn., exhibit a beautiful case, or perhaps better, a case of beautiful ores (both expressions are correct, if applied to what they have sent), from which the iron is made that is used in the manufacture of wheels. There are also specimens of pig-iron, chill-tests, broken pieces of the tread of wheels, and also of charcoal used in the manufacture of iron. Some of the latter is worthy of note. Branches of trees three or four inches in diameter and as many feet long are shown completely charred, but the form is still so perfectly preserved that the moss on the bark can still be seen. Another piece of a section, several feet long, of the trunk of a tree 18 inches in diameter is completely charred and still preserves its form. A notice in the case containing the ores, etc., refers persons interested in the process of manufacture to an album of drawings and photographs of the works, form of furnaces used, etc. This album can be seen in the rooms of the American Society of Civil Engineers in the Main Building. It is very large and elaborately prepared, but the drawings show evidence of having been made by a person somewhat inexperienced in that kind of work, and they hardly do justice to the subject, a full description and illustration of which would have had so much value at the present time.

The wheels exhibited are most of them of the Washburn pattern, the largest being 36 inches in diameter. There is a pair of spoke wheels for an engine truck with their treads turned. These wheels are on an axle which is turned its whole length. There are also several small wheels for narrow-gauge roads. It is to be regretted that so excellent a display should be marred by touches of chromo-engineering. There are a number of wheels in the condition in which they came from the foundry, but there is one virulent example, painted red, white and blue, and others brilliant in paint and gilding. The exhibit would have been much better without these.

## DAVENPORT, FAIRBAIN &amp; CO.,

of Erie, Pa., have a very modest exhibit consisting of pig iron, chill-tests, pieces of broken wheels, turning chips and wheels. The chips are exhibited to show the toughness of the metal. The wheels exhibited are: One 24 in. narrow-gauge wheel, 26, 28, 30 and 33 in. double-plate or Washburn pattern wheels. These are all painted lead color, and are entirely free from any touches of chromo-engineering. The capacity of the works is said to be 350 wheels per day. As it has been necessary to mention before, it is impossible from a casual inspection of wheels to know about their quality. All that can be said of them is, that they appear to be good.

## THE TAYLOR IRON WORKS,

of High Bridge, N. J., also make a very unpretentious show of their products. They have two 30 in. wheels pressed on an axle of the Master Car-Builders' standard pattern, and two 33 in. wheels, both kinds being of the Washburn pattern; a 26 in. spoke wheel, a pair of narrow-gauge wheels, and a wheel broken in two, which, it is said, "after having twelve holes drilled across the face, required 67½ tons pressure on a tapered axle to crack the hub, and 176 blows of a heavy sledge to crack the plate and tread." Specimens of axles, one bent double cold, and of car draw-hooks are also exhibited.

## SAX, KEAR &amp; CO.,

of Pittston, Luzern Co., Pa., exhibit specimens of their wheels, which consist of a steel tire welded to a cast-iron centre. This is done by first heating the tire to a very high heat in a suitable furnace, and then placing it in a suitable mould or flask and pouring the melted iron into the mould, and thus welding the iron and the tire together. The tires are made of Standard crucible steel. They have in their space 30 and 33 in. single-plate and 28 and 30 in. spoke wheels, also some specimens showing the perfect weld between the two metals, and turnings showing the quality of the metal in the wheels on exhibition. The specimens showing the weld consist of sections of the wheels polished and some of them with a rough fracture. The quantity of red and blue paint used on them lays them open to the charge of chromo-engineering.

## THE WASHBURN CAR-WHEEL CO.,

of Hartford, Conn., also manufactures cast-iron steel-tired wheels, under the patents of Messrs. Sax & Kear. This company exhibits specimens of 33-in. Washburn pattern and 28, 30 and 33-in. spoke wheels, with steel tires. One pair of 33-in. wheels is shown with an inscription saying that they ran on the express train between New York and Boston, and made the extraordinary mileage of 460,000 miles and are still good for 75,000 miles more. They have been reduced by turning about ½ in. in diameter, and have worn out two axles and are now

## RAILROAD EARNINGS AND NET EARNINGS YEAR 1875.

NAME OF ROAD.	Mileage.		Gross Earnings.		Per cent. of Expenses.		Net Earnings.		Gross earn. per mile.		Net Earn. per mile.	
	1875.	1874.	1875.	1874.	1875.	1874.	1875.	1874.	1875.	1874.	1875.	1874.
Allegheny Valley.....	259	219	2,369,638	2,899,472	58.97	61.85	\$84,442	\$18,687	9,266	10,911	\$3,022	\$4,336
Atchison & Nebraska.....	149	149	270,955	355,205	59.58	76.53	772	82,890	1,823	2,376	2	887
Atlantic, Topoka & Santa Fe.....	547	507	1,520,268	1,820,806	51.07	49.96	743,927	626,064	2,779	3,457	1,860	1,280
Atlantic & Gulf.....	605	605	4,397,403	5,014,323	75.98	75.42	1,047,109	1,232,546	7,169	8,289	1,731	2,077
Belvidere Delaware.....	346	346	965,870	1,032,256	65.15	71.23	326,929	297,028	2,791	2,984	945	869
Bridgeton & Port Norris.....	80	80	693,370	1,315,648	71.21	63.64	257,223	442,000	11,167	15,196	3,215	5,285
Buffalo, Corry & Pittsburgh.....	21	21	37,913	24,889	86.15	89.48	5,263	2,619	1,805	1,244	251	128
Burlington, Cedar Rapids & Minnesota.....	43	43	154,801	155,887	111.76	88.70	*18,198	17,610	3,600	3,625	*423	410
Baltimore & Potomac.....	407	407	1,311,377	1,246,912	64.53	65.16	465,090	421,983	3,221	3,064	1,143	1,097
Camden & Atlantic.....	92	92	678,092	615,415	81.11	78.79	128,079	130,607	7,871	5,689	1,392	1,419
Central, of New Jersey.....	67	67	545,493	629,587	62.11	64.38	207,643	241,747	8,186	7,909	3,099	3,006
Central, of Ohio.....	309	309	7,411,837	8,889,631	55.71	48.20	3,282,910	4,449,080	23,966	29,516	10,624	18,184
Chicago & Alton.....	28	28	73,029	71,126	61.80	73.79	34,728	18,681	3,160	3,121	1,523	818
Chicago, Burlington & Quincy.....	1,268	1,268	11,791,361	11,645,318	54.93	55.93	5,361,338	5,131,906	9,299	9,213	4,238	4,060
Chicago, Milwaukee & St. Paul.....	1,400	1,399	8,255,744	8,953,017	62.63	65.58	3,085,390	3,081,901	5,897	6,400	2,204	2,208
Cleveland, Columbus, Cincinnati & Indianapolis.....	471	471	3,774,217	4,248,608	76.58	78.75	884,024	902,675	8,008	9,111	1,875	1,914
Cleveland, Mt. Vernon & Delaware.....	157	157	426,027	445,800	77.31	69.50	95,667	135,954	2,715	2,941	615	866
Cincinnati & Muskingum Valley.....	148	148	395,227	429,829	90.90	100.84	35,748	*8,600	2,670	2,996	*241	*24
Columbus, Chicago & Indiana Central.....	581	581	3,619,654	3,865,853	63.26	75.53	605,442	933,991	6,235	6,586	1,045	1,592
Columbus & Hocking Valley.....	89	89	877,591	717,490	59.28	50.20	358,376	357,077	9,861	5,082	4,927	4,012
Detroit, Lansing & Lake Michigan.....	184	184	739,704	807,697	71.49	60.62	210,897	316,29	3,914	4,274	1,146	1,719
Detroit & Milwaukee.....	189	189	912,547	1,151,207	66.21	82.04	34,185	205,794	4,776	6,091	181	1,094
Flint & Pere Marquette.....	281	281	1,055,054	1,063,988	60.91	69.88	368,598	304,974	3,754	5,686	1,276	1,609
Freehold & Jamesburg.....	98	98	61,873	66,397	65.87	99.85	2,540	96	2,199	2,372	91	4
Greenville & Columbia.....	154	154	536,192	591,934	55.00	54.31	241,286	270,445	3,269	3,600	1,471	1,649
Huntingdon & Broad Top.....	59	59	322,830	284,721	67.43	70.39	137,430	84,299	5,495	4,846	2,399	1,435
Illinois Central.....	1,108	1,108	7,841,782	7,947,855	60.87	60.70	3,892,336	3,917,705	7,079	7,176	3,478	3,538
International & Great Northern.....	429	429	1,408,303	1,572,388	66.26	62.48	615,933	747,469	3,087	3,674	1,841	1,748
Knos & Lincoln.....	49	49	146,214	161,569	49.38	48.73	74,018	92,843	2,964	3,297	1,511	1,981
Lake Shore & Michigan Southern.....	1,175	1,175	14,494,199	17,146,131	72.96	65.04	3,902,998	5,993,769	12,284	14,592	3,321	5,101
Louisville, Cincinnati & Lexington.....	231	231	1,133,952	1,121,296	72.37	80.23	313,357	290,908	4,909	4,854	1,357	886
Little Miami.....	196	196	1,242,787	1,338,612	80.40	74.04	243,872	266,426	6,344	6,805	1,244	1,354
Maine Central.....	355	355	1,786,076	2,094,081	64.23	61.20	639,010	812,399	5,031	5,999	1,890	2,388
Marietta & Cincinnati.....	314	314	1,662,015	2,094,511	77.56	75.36	371,425	528,151	5,299	7,278	1,189	1,816
Morris & Essex.....	137	137	4,340,351	3,946,162	68.37	69.47	1,372,994	1,304,888	31,681	28,804	10,021	8,796
Missouri River, Ft. Scott & Gulf.....	161	161	677,548	693,400	68.08	69.05	199,385	268,921	4,210	4,361	1,213	1,763
Mobile & Ohio.....	627	627	1,914,347	2,391,019	61.12	70.39	361,453	707,865	3,633	4,537	686	1,343
New Jersey Southern.....	176	176	515,810	513,855	78.31	74.72	109,276	129,844	2,931	2,919	621	738
Norfolk Central.....	326	326	4,266,249	4,876,500	68.25	72.36	1,594,124	1,992,947	15,111	14,569	4,798	4,028
Norfolk & New Jersey.....	30	30	278,922	295,054	87.53	85.94	34,777	41,491	10,730	11,348	1,338	1,596
Oil Creek & Allegheny River.....	115	115	809,796	846,852	70.50	66.38	238,920	284,732	7,042	7,384	2,078	2,476
Ogden Mine.....	10	10	38,442	41,958	44.85	47.04	21,393	22,223	3,844	4,196	2,139	2,222
Pennsylvania, Main Line.....	350	350	18,363,944	20,299,331	55.86	54.26	8,105,206	9,285,854	51,296	56,702	22,640	25,938
Pennsylvania, Branches.....	547	519	2,129,308	2,343,460	75.05	72.04	531,354	654,999	3,893	4,615	971	1,392
Philadelphia & Erie.....	288	288	3,365,897	3,506,919	68.21	69.30	1,137,414	1,038,766	11,687	12,177	3,949	3,711
Pittsburgh, Cincinnati & St. Louis.....	391	391	3,175,970	3,673,316	76.20	72.10	733,962	996,792	15,833	17,812	3,659	4,969
Pittsburgh, Ft. Wayne & Chicago.....	468	468	7,863,654	8,599,472	68.25	68.79	3,261,673	3,544,142	16,159	18,075	6,963	7,867
Quincy, Missouri & Pacific.....	70	70	130,612	107,151	69.27	64.62	40,146	16,486	1,865	1,881	874	288
Rome, Watertown & Ogdensburg.....	257	222	1,107,825	1,172,901	75.83	65.67	262,240	402,644	4,544	5,263	1,096	1,814
St. Croix & Penobscot.....	32	32	55,112	65,979	63.15	63.15	19,748	24,311	5,505	2,989	697	1,105
St. Louis, Alton & Terre Haute, Belleville Line.....	71	71	561,899	569,347	69.21	63.67	229,189	269,668	7,914	7,878	3,172	3,601
St. Louis, Iron Mountain & Southern.....	684	681	3,802,941	3,244,071	62.95	64.92	1,789,088	1,137,864	5,560	5,783	2,616	2,028
St. Louis, Kansas City & Northern.....	604	628	2,637,933	2,405,651	79.41	72.52	547,360	601,028	5,279	4,899	1,087	1,348
St. Louis, Vandalia & Terre Haute.....	188	188	1,031,414	1,065,433	80.50	75.35	202,019	262,591	6,512	6,726	1,279	1,658
St. Paul & Sioux City.....	132	122	580,114	845,190	68.60	73.10	175,945	181,872	4,990	4,489	1,442	1,245
Sioux City & St. Paul.....	148	148	317,464	381,117	76.10	68.20	78,747	89,368	2,145	1,899	513	604
South Carolina.....	242	242	1,220,303	1,367,971	63.50	62.36	445,376	515,457	5,080	5,645	1,854	2,130
Sussex.....	35	35	116,610	124,441	80.78	74.35	22,410	56,315	3,332	4,014	640	823
Tuckerton.....	31	31	31,517	36,735	81.27	64.75	5,903	12,949	1,317	1,185	190	418
Union Pacific.....	1,032	1,032	11,993,892	10,559,880	41.54	45.97	7,011,784	5,907,565	11,622	10,323	6,794	5,724
United New Jersey.....	301	276	8,643,924	8,700,969	69.19	69.26	2,749,183	2,370,936	28,717	31,625	9,134	8,980
Western Union.....	213	213	1,160,430	1,123,105	71.50	68.40	330,142	354,944	5,454	5,970	1,552	1,668
West Jersey.....	128	128	659,798	623,391	55.05	70.21	293,288	185,700	5,148	4,264	2,288	1,449
Totals.....	19,882	19,371	170,193,959	179,070,038	63.08	62.35	62,838,161	67,424,218	8,569	9,244	3,164	3,451

\* Deficit.

on the third, the journal of which is 6½ in. long and 3¼ in. diameter. This fact ought to be an argument in favor of larger axles if steel-tired wheels are used.

## THE AMERICAN PAPER CAR WHEEL CO.,

of Hudson, N. Y., has specimens of 30, 33 and 42-in. wheels of its manufacture. These wheels have steel tires made with an inside flange and a cast-iron hub. On each side of the hub and tire wrought-iron or steel plates 3-16 in. thick are bolted, and the space between the plates is filled with compressed air, rather, condensed paper. This paper is made of straw boards about ½ in. thick, pasted together with paste made of rye flour, and first made into sections about ½ in. thick. These are subjected to a pressure of about 400 tons for about five hours, and are then dried with hot air. These sections are then pasted together in the same way, so as to get the requisite thickness, about 3¼ in., and are again pressed and dried. They thus form a disc which is turned off and the tire forced on with a pressure of about 150 tons. The plates are then bolted to the inside and outside of the wheel with ½-inch bolts. An old wheel is exhibited, "one of the first paper car wheels ever made. It has run under a Pullman car 312,900 miles without the tire being turned." One of the wheels is shown with a portion of the plates and paper disc cut away, so as to show the inside structure. One of the paper discs is also exhibited, and if a separate tire and hub were shown the exhibit would be complete. The wheels are painted brilliantly red, which might be described as monochrome-engineering.

## W. A. MILES,

of the Copake Iron Works, Columbia County, N. Y., exhibits a 39-in. wrought-iron car wheel with a steel tire welded on. There was no exhibitor present to explain the process of its manufacture, nor any circulars to give any information whatsoever. The public are evidently expected to evolve all these portulcaries out of their inner consciousness, but unfortunately the writer was not possessed of sufficient amount of what the Germans call "Geist" for this difficult task, so he cannot enlighten his readers on what the inventor or manufacturers apparently do not think it worth while to explain.



great care. We know of no publication which gives in so small a compass so much of the most recent practice in the form of rails and fish-plates. It is very convenient for reference and is in many ways a model of this kind of publication.

.....Mr. Charles Latimer, Chief Engineer of the Atlantic & Great Western, whose name will secure attention and respect to his opinions on any subject that he has investigated, has published a little book entitled "The Divining Rod;" or, rather, he has reprinted a paper on that subject which he contributed some time ago to the Civil Engineers' Club of the Northwest, with notes and additions from other writings on the subject. Mr. Latimer not only declares his belief that water and minerals hidden underground may be discovered by the use of a stick or rod in the hands of certain persons, but describes how he has done this himself, and essays a sort of provisional explanation of the phenomenon, and establishes what may be called the elements of a science of "water-witching," which he believes to be wholly referable to natural laws, and capable of scientific explanation. Mr. Latimer says that any rod which is a conductor will suffice, and that a straight copper wire will answer as well as a forked branch of witch-hazel. In his hands the rod will turn for an iron rod, a gas pipe under the floor, the top of an iron column, etc., as well as for water, and for still as well as for running water, but will not turn for anything if his feet are insulated, whence he concludes that electricity has something to do with it. The turning begins when a line from the rod to the water makes an angle of 45 degrees with the surface, so the latter's distance underneath the ground may be found by measuring the distance from the point where the rod begins to turn to that where it points perpendicularly downward. Mr. Latimer's pamphlet is certainly very interesting, and gives reason for a thorough and really scientific investigation of the matter.

## General Railroad News.

### PERSONAL.

—Mr. T. F. Dunaway, Chief Train Dispatcher Mississippi Division, Mobile & Ohio Railroad, resigned his position, June 1, on account of ill health, and has come East for a time. Before leaving his post, which he had occupied about three years, the employees of the division presented him with a handsome gold watch. The presentation took place May 31.

—A very handsome monument has been recently erected, by his friends, in Aspen Grove Cemetery, at Burlington, Ia., to the memory of Mr. Leo Carper, formerly Division Superintendent on the Chicago, Burlington & Quincy, who, as some of our readers may remember, was killed in an accident on that road March 5, 1872.

—Of the new receivers of the Atlantic, Mississippi & Ohio road, Mr. Charles S. Perkins is head of the railroad supply house of Perkins, Livingston & Post, of New York. Mr. Henry Fink has been connected with the road over 20 years, having been appointed Roadmaster of the Norfolk & Petersburg in 1855 and Superintendent in 1859. In 1869 he became Superintendent of Transportation of the consolidated road, and he continued to hold that position until now. He is a brother of Mr. Albert Fink.

—Mr. K. F. Booth, Chief Engineer of the Chicago & Alton road, who went to California for his health some six months ago, has returned to Chicago, having completely recovered.

—Mr. Ransom Gardner, a well-known contractor, died at Anderson, Ind., June 9, after a brief illness. He was born in Fort Ann, N. Y., in 1814, but removed to Michigan in 1837 and has ever since resided there. As contractor he built part of the main line of the Michigan Southern road, its Detroit, Adrian and Kalamazoo branches; a section of the Chicago & Rock Island and other lines. He had just completed the Cincinnati, Wabash & Michigan road.

### THE SCRAP HEAP.

#### Railroad Manufactures.

The Joliet Iron & Steel Company, at Joliet, Ill., is running both its blast furnaces and the Bessemer steel works full time. The Cleveland (O.) Iron Company is running on a large order for spikes and other track supplies for the Great Western Railway of Canada.

The North Chicago Rolling Mill is running full time as also are its Bessemer steel works.

The Cleveland (O.) Review says: "Angel & McCormick, lessees of the McNairy & Claflin Co.'s works, have just shipped four handsome street cars to Milwaukee. They have recently shipped six of a similar kind to Minneapolis and have completed three for Toronto and have an order for one more from the same place."

The Indianapolis Rolling Mill has closed a contract to re-roll 1,500 tons of rails for the Cincinnati, Hamilton & Dayton road. The Cambria Iron Company, at Johnstown, Pa., is shipping large quantities of steel rails. On one day of last week 1,178 tons were sent away.

The Ohio Falls Car Works at Jeffersonville, Ind., were offered for sale June 10, at Charlestown, Ind., subject to a mortgage for \$121,000. No bids were made and the sale was adjourned.

Alabama Furnace, on the line of the Selma, Rome & Dalton road, is making from 20 to 24 tons of pig per day, although a very small furnace.

Shelby Furnace, at Shelby, Ala., is making a fine grade of charcoal iron, much of which is shipped to New Haven, Conn., being sold to parties there.

The Terre Haute Car Company has leased the tools, etc., of the Southwestern Car Company from the assignee and has begun work in the Prison shops at Jeffersonville, Ind.

The trouble between the Pittsburgh manufacturers and the puddlers is still unsettled, though several efforts at a compromise have been made.

#### Prices.

Quotations for American rails in the East are: Iron, at the mills \$38 to \$40; steel, \$60 to \$63; old rails, \$21 to \$23. It is said that the Texas & Pacific has purchased in Pennsylvania 12,000 tons at prices equivalent to \$46 to \$48 delivered on the Mississippi or the Gulf; the Reading Company is said to have sold part of the lot at a little less than \$39 at the mills. Railroad spikes are 2½ to 3 cents per pound.

#### A New Railroad War.

The Saratoga (N. Y.) Saratogian says: "A two-year old bull of a bellicose and disputatious turn of mind brought the train up yesterday morning to a stand-still just this side of Mechanicville. The engineer saw the bull on the track and looked for him to get off. But the young bovine evidently regarded the locomotive as a big rival, and at every toot of the whistle he answered back a bellow, and began to paw up the dirt and lash his tail as if he could lick the bull in creation. The whistle whistled, the bull bellowed. The engineer hallooed at the bull, but the bull lowered his head and challenged

the locomotive to come on. Then the engineer stopped his train and went out and told the bull to 'get off.' The bull refused, and then the brakemen rallied and a grand charge was made on the bovine, but the bovine went for the brakemen and drove them out. So they armed themselves with fence rails and boulders, and amid cheers and shouts of the assembled passengers and the inspiring shrieks of the whistle, the fight opened once more. For some time it was doubtful which way the tide of battle would turn. At last, however, the bull was defeated by a piece of strategy. A feint was made in his front while the enemy moved by a flank, and taking Mr. Bull in the rear got possession of his tail. This substantially ended the fight, and the bull was ignobly turned into the ditch. The battle for the possession of the road lasted about ten minutes, and was one of the most lively struggles made for the possession of a railroad known in history.

### OLD AND NEW ROADS.

#### Valley, of Virginia.

The representatives of the Baltimore city stock have been instructed to vote at the coming adjourned meeting for a lease of the road on the best terms obtainable, provided the rental shall not be less than \$20,000 and half the net earnings and the term of lease not more than 15 years. They are also directed to require satisfactory security for the performance of the conditions of the lease, and to insist upon provisions which will give the Western Maryland road a right to contract for traffic over the Valley road upon terms as favorable as those accorded to any other connecting line.

#### Massillon & Coshocton.

It is said that work is soon to be begun upon this road and that arrangements have been made for its early completion. It is to extend from Coshocton, O., north by east to the Cleveland, Tuscarawas Valley & Wheeling road at Barr's Mills, some 12 miles south of Massillon, and will be a little over 30 miles long.

#### Gulf, Western Texas & Pacific.

On June 1 this road was closed to travel, all trains withdrawn, the equipment stored up and all employees discharged except the few watchmen required to preserve the property from destruction. The road extends from Indianola, Tex., to Cuero, 70 miles, and is chiefly owned by Mr. Charles Morgan, the New Orleans steamship owner.

#### Wabash & Erie Canal.

The Special Master reports to the United States Circuit Court that the purchasers of the canal from Lafayette to the Ohio line have refused to complete their purchase, unless certain lots and lands which they claim belong properly thereto, but which were sold separately, are included in the transfer. The Master asks that the Court decide this question and enable him to conclude the matter. Most of the parties who bought the outlying tracts of land have fulfilled the conditions of sale, but a few have not. The Master asks authority to sell at private or public sale those tracts the purchase of which was not completed and also some property withheld from sale as being covered by leases with privileges of purchase attached.

#### New York, Boston & Montreal.

The bondholders, for whose account the trustee bought in the New York & Boston Division at the foreclosure sale, met in New York, June 12, and appointed a committee to prepare a plan of reorganization. The committee consists of the following bondholders: Lewis May, A. V. Stout, Wm. H. Guion, Lewis Roberts, Christian Meyer, Jos. Seligman.

#### Coldwater, Marshall & Mackinaw.

Several meetings have been held to consider what could be done to secure the completion of this road from Coldwater, Mich., to the St. Joseph River. It has been proposed to use the road-bed graded for the Mansfield, Coldwater & Lake Michigan road, but the trustees have given notice that any use of such road-bed must be subject to the first mortgage of \$20,000 per mile thereon, which is now in process of foreclosure.

#### Bingham Canon & Camp Floyd.

This company reports its earnings and expenses for the five months ending May 31, as follows:

Gross earnings (\$2,301 per mile).....	\$50,613 68
Expenses (\$4.38 per cent.).....	22,463 09
Net earnings (\$1,280 per mile).....	\$28,150 59
The total tonnage carried was 27,181 tons, chiefly ore and bullion. For the two years ending Dec. 31, 1875, the earnings and expenses were:	
Gross earnings (\$9,206 per mile).....	\$202,534 25
Expenses (\$3.05 per cent.).....	107,441 78

Net earnings (\$4,884 per mile)..... \$95,092 47  
The road is 22 miles long, from Sandy, Utah, through Bingham Canon to Bingham. The capital account consists of \$600,000 stock and \$300,000 8 per cent. gold bonds.

#### Rocheater & State Line.

Mr. J. Condit Smith is now making arrangements to carry out his contract for the completion of this road. It is expected that all matters will be settled so that work can be begun soon.

#### Columbus, Chicago & Indiana Central.

Argument has been in progress this week in the United States Circuit Court as to the disposition of the net earnings for 1875, which the court recently directed the lessee to pay over to the receivers, and the net earnings for the first quarter of 1876, which will be payable July 1. The parties represented are the stockholders and the bondholders of various classes, and Mr. James Pullan, trustee for the overdue mortgage of the old Richmond & Newcastle road also appears by counsel.

#### Houston & Texas Central.

The repair shops at Houston, Tex., are now actively engaged in preparations for the change of gauge. A large number of new car trucks of the standard gauge are being turned out, and such of the engines as are deemed worth the change are being altered. The oldest of the engines will not be changed, but will be worn out on the Austin Branch, where the 5 ft. 6 in. gauge is to be retained for a time. About four sets of new or altered trucks are turned out daily.

#### Pacific Mail.

The new board has agreed upon a settlement of the differences with the Panama Railroad Company upon the following basis:

1. The Panama Railroad, through Mr. Park, its President, agrees to postpone the payment of its entire debt of the Pacific Mail (on the adjustment of the same) until May 1, 1877, holding the same securities for the entire debt they now hold.
2. The Panama Railroad Company and the Panama Transit Company agree to admit the Pacific Mail into its connections with the Panama Railroad on the same terms made by contract with the Panama Transit Company, without any charge for commissions or other charges, except those made to the Panama Transit Company.

The pressing floating debt of the company has been provided for by advances made by the members of the new board.

#### Terre Haute, Worthington & Bloomfield.

The object of this company is to utilize that portion of the Wabash & Erie Canal which extends from Terre Haute, Ind.,

southward to the Ohio River by the construction of a narrow-gauge road upon the towpath, which can be made ready for the rails at a comparatively small cost. The first section to be built is from Terre Haute south by east to Bloomfield, about 45 miles, the further extension to depend upon circumstances. No subsidies are to be asked for.

#### New York Central & Hudson River.

The New York City Council has sustained the Mayor's veto of the ordinance allowing this company to run its cars through West street to the new freight depot now being established at Piers 25 and 26, North River. This will not prevent the use of the new depot, but it will oblige the company to transfer all the cars going to that depot from Sixty-fifth street on barges.

#### Davenport & St. Paul.

In the suit brought by Perkins, Livingston & Post, M. K. Jesup & Co., and others against the individual members of the Davenport Construction Company to recover for rails and supplies furnished, the New York Supreme Court has given judgment for \$306,206.37 gold. The suit was brought against individuals on the ground that the Construction Company was not legally organized. An appeal will doubtless be taken.

#### Blackwoodtown & Camden.

A company is to be organized to build a short branch from Blackwoodtown, N. J., to the proposed narrow-gauge line from Camden to Atlantic City.

#### Grand Southern.

Work was begun on this road at St. George, N. B., June 8, with some ceremony. About 40 miles of the grading have been sub-let, of which James Savage, of Augusta, Me., has 15 miles from St. George eastward towards St. John; Mr. McLane, lately from the Intercolonial, has seven miles from St. George westward, and Smart & Rudge have 20 miles, from Didgeguash to St. Stephen.

#### Pennsylvania.

A line has been surveyed for a branch from Manor, Pa., north by east to Delmont in Westmoreland County, about eight miles. It is understood that the company will iron and equip the branch if the people along the line will grade and bridge it.

#### Central Vermont.

The St. Albans Messenger of June 9 says: "The Central Vermont Railroad Company, Tuesday, June 6, filed its account as Receiver of the railroads for the year ending July 1, 1875. All sums of money paid out for rents of the different roads, and all payments of interest on the funded debt are not included in the statement. The figures show a falling off of \$735,667 during the six months ending July 1, 1875, as compared with the six months ending Jan. 1, 1875, and a falling off in the net earnings at the same time of \$317,663.

The gross earnings were.....	\$3,772,065 79
The expenses.....	2,689,867 44
Leaving net earnings.....	\$1,082,198 35
The rent during the same period was.....	1,082,600 00

Leaving..... \$198 35  
"This is only \$198.35 to pay the interest on the funded debt, which is \$320,000. As this lacks \$319,801.65 of paying that interest, it follows that the floating debt of the management was increased that amount during the year.

"Not one dollar has been paid to the owners of the property, and it requires but a bare inspection of the figures to show how easy it is to compete with Vanderbilt and the New York Central for Western business. The poor little Missisquoi, in which this county is so much interested, lacked \$23,481.32 of paying expenses."

#### Pacific, of Missouri.

As noted last week a decree or foreclosure of the third mortgage upon this road has been made. The proceedings are thus given in the St. Louis Republic of June 7: "Mr. Frank J. Bowman \* \* then, as Attorney for the County, withdrew the answer and cross-bill of Thomas P. Akers of St. Louis County in the Ketchum case. Following this he also withdrew the answer of the county of St. Louis contesting the validity of the third-mortgage bonds of the road, at the same time remarking that one of his reasons for so doing was that he had become satisfied that the Pacific Railroad was so encumbered that its stock was worthless. His action in the premises he likewise stated was directed by the committee of the County Court.

"A decree of foreclosure of the Pacific Railroad was consented to, the same to be made subject to the rights of the county of St. Louis to its claim for \$700,000, and the county's right to prior lien therefor over all encumbrances to be in no way prejudiced by the foreclosure.

"All further hearing upon the bill of intervenor of the county of St. Louis for the establishment of its lien of \$700,000 was continued by consent until the September term of the court.

"It is understood that a contract has been entered into between the county and C. K. Garrison, representing third-mortgage bondholders, by which the county is safely secured against possibility of loss of the amount of its lien.

"The \$41,000 interest due from the Pacific Railroad has been collected by Mr. Bowman and turned over to the receivers.

"Judge Caldwell, in alluding to the receivers, said that of course they were officers of the court, but the court would not permit them to come in and intervene and raise issues without leave of the court. Whenever they desired to do so, they should first, by their attorney, file a motion for leave.

"The court directed Seymour D. Thompson, Esq., master in chancery, to draw up an order in favor of eleven claimants, under statutory liens, whose claims he had recommended."

The formal decree of foreclosure and sale has since been entered. Mr. Thompson also reported in favor of the payment of the claims referred to him.

June 9, the receivers submitted for the approval of the court an agreement by which they are to lease from the receivers of the Atlantic & Pacific 8 locomotives, 300 box, 8 caboose and 2 wrecking cars at a monthly rental of \$7,500.

#### Atlantic & Pacific.

In the United States Circuit Court at St. Louis, June 7, a decree of foreclosure of the second mortgage and an order of sale were entered. The receivers are to sell the road at public sale, upon 60 days' notice, such portion of the road and other property as is covered by the first mortgage executed by the South Pacific Railroad Company to be sold subject to that lien. The property is to be sold together, as a whole. The purchasers, if bondholders, may pay \$100,000 in cash and such further amount as may be necessary to satisfy the claims of bondholders not joining in the purchase for their pro rata share; the balance may be paid in second-mortgage bonds. The amount of first-mortgage bonds outstanding is named in the decree as \$7,197,500.

The decree was subsequently amended by directing the payment in cash of such further sum, not exceeding \$800,000, as and when the court may require and direct to be paid, for the purpose of satisfying any (statute, equitable, or other lien) claims that on a hearing and accounting had between the Atlantic & Pacific Railroad and the Pacific Railroad, may be found due and owing to said Pacific Railroad.

This leaves the question as to which of the two roads should be chargeable with the claims for supplies to be finally determined at the fall term before Judge Dillon.

All claims against the road are referred to Seymour D. Thompson, as Master, for examination and report.



A meeting of the bondholders was held in New York, June 12, and a committee, consisting of Andrew Peirce, J. P. Robinson, Wm. H. Coffin, Jos. Seligman, Wm. L. Buckley, F. Butterfield and Uriel Crocker, was appointed to prepare a plan of reorganization.

The receivers state that they have made no statement to the effect that the coupons next due on the first-mortgage bonds would not be paid.

#### Southern Railroads.

The committee appointed by the stockholders of the Central Railroad of Georgia at their last meeting has, through its Chairman, Mr. R. N. Gourdin, of Savannah, addressed a letter to the Southern Railway and Steamship Association. The letter is very long and expresses the belief that all stockholders who are in a position to take an intelligent view of the present condition of Southern railroad property must be aware that their future prospects of returns from their investment depend upon the adoption of the policy of combination, as opposed to competition. The association is assured of the hearty support of all such stockholders and of the exercise of their influence upon the managements accordingly.

The Mobile (Ala.) Register says:

"In the eleven Southern States—Virginia, West Virginia, North and South Carolina, Kentucky, Tennessee, Georgia, Florida, Alabama, Louisiana, and Mississippi—there are 85 railroad companies, which own, or control by lease, 12,620 miles of railway.

"Thirty-nine of these companies, controlling 6,135 miles (about 48 per cent. of the whole), have either gone through bankruptcy since the completion of their roads, or are now in possession of the courts preparatory to a foreclosure.

"By consolidation, lease and purchase, 18 companies control 6,088 miles of road; while 43 others, owning or controlling less than 100 miles each, aggregate only 1,954 miles—or one-half the companies own only about one-sixth of the whole. The South Carolina Railroad, from Charleston to Hamburg—the first road of any importance in the South—was commenced in 1828 and finished in 1836.

"Of the six roads (including the South Carolina) as first finished, they are all, except the Seaboard & Roanoke, now in the possession of the original companies, and with one exception, are paying dividends. In the early history of these roads two of them—the South Carolina, and Wilmington & Weldon—borrowed money in England at 5 and 6 per cent. interest, without mortgage or hypothecated securities, or collaterals, to finish the roads, and (people were honest then) it was unpaid at the beginning of the war, but at its close, satisfactory arrangements were made to secure these debts in full. This is a bright spot in Southern credit, and in strong contrast with the darkness in which Southern credit has been enveloped since the war. There are 4,403 miles of railway owned and controlled by twenty-six companies, now in possession of the State and United States Courts, undergoing proceedings of foreclosure. The cost of the lawyer's fees and incidental costs of court has been in other cases from \$500 to \$1,200 per mile of road.

"Let those who complain of these monopolies and high charges for transportation, think over these figures, and recollect that the stock and bondholders have already lost \$150,000,000 by failures and an equal amount in other roads which pay neither interest or dividends. The foregoing does not include any road west of the Mississippi river, or any part of the Baltimore & Ohio Railroad, or any road north of the latter in West Virginia."

#### Toledo, Wabash & Western.

The sale of this road under foreclosure of the consolidated mortgage took place as advertised in Toledo, O., June 10. But few persons were present and the property was sold for \$2,500,000 to Mr. John W. Ellis, of New York, who represented the committee of the consolidated or gold mortgage bondholders, consisting of himself, John F. Martin, George I. Seney, A. M. White and H. A. V. Post.

The sale included all the property owned by the company, consisting of the Main Line from Toledo, O., to Camp Point, Ill., 452 miles; the St. Louis Division, from Decatur, Ill., to East St. Louis, 108½ miles; the Naples Branch, from Bluffs, Ill., to Naples, 4 miles, and the Keokuk Branch, from Clayton, Ill., to Elvaston, 34½ miles, being 599 miles in all. The company leased the use of 21½ miles of the Chicago, Burlington & Quincy, and 7 miles of the Toledo, Peoria & Warsaw, from Elvaston to Keokuk, Ia., and these leases will doubtless be continued, as they are essential to the completeness of the road. Other leases are held of the Hannibal & Naples road, 52 miles; the Lafayette, Muncie & Bloomington from Lafayette, Ind., to the Illinois line, 36 miles; the Lafayette, Bloomington & Mississippi, from the State line to Bloomington, Ill., 81 miles, and the Pekin, Lincoln & Decatur, from Decatur to Pekin, 67 miles. These leases are terminated by the sale and may or may not be renewed. The two last-named roads have recently been sold under foreclosure and are now owned by the bondholders.

The sale was made subject to all the liens prior to the consolidated gold mortgage, amounting to all \$17,696,000. None of these prior mortgages, however, covered the entire line. As all these bonds bear 7 per cent. interest, the annual interest charge remaining on the road will be \$1,238,720, or about \$2,065 per mile. The consolidated gold bonds outstanding were \$5,000,000. The holders of \$4,943,000 of which united with the committee in the purchase. The stock, which is wiped out by the sale, consisted of \$15,000,000 common and \$1,000,000 preferred stock, \$16,000,000 in all.

The purchasing bondholders have, it is understood, agreed upon a plan of reorganization which is approved by the holders of a very large amount of the prior bonds also.

It appears, however, that on the day of the sale the Indiana Circuit Court at Logansport made an order for a stay of the foreclosure proceedings on application of the stockholders' committee, the ground for the stay being that the decree was defective in allowing a sale without redemption; that the original complaint was defective; that the decree was *ex parte*; that the directors had sided in the proceedings and that the stockholders had a right to be heard in defense. It is not quite clear that the stay was effective, being granted so near to the time of sale; its results remain to be seen. The sale was made under concurrent decrees of the State Courts in Ohio, Indiana and Illinois.

#### St. Louis & Southeastern.

A new complication in the affairs of this company has been introduced by the commencement of a suit in the Christian County (Ky.) Circuit Court to set aside the decree of foreclosure under which the road from Henderson, Ky., to the Tennessee State line, was sold in 1867 and transferred to the Evansville, Henderson & Nashville Company. The complaint sets forth that the original company, known as the Henderson & Nashville Company, in 1854 issued \$750,000 bonds, and in 1856 \$186,000 of these bonds were sold in England. When the war commenced a good deal of work had been done on the road, but it was then stopped and in 1866, the road being then still in an unfinished state, a plan was devised in pursuance of which some \$500,000 of the unsold bonds, with the unpaid coupons attached, were issued to parties having claims upon the road at a merely nominal price. These parties thereupon brought suit to foreclose the mortgage, and a decree of foreclosure was granted under which the road was sold Feb. 23, 1867, for \$20,000, to one of the bondholders, who transferred it shortly afterwards to the Evansville, Henderson & Nashville Company, which was organized under

a special charter which had meantime been obtained from the Kentucky Legislature. The English holders of the \$186,000 bonds now appear and claim that they had no notice of the foreclosure proceedings and knew nothing of the sale of the road until long afterwards; that the whole proceeding was irregular and the foreclosure was obtained by collusion and fraud, and with intent to deprive them of their rights and their equitable lien on the property. They ask that the decree may be set aside and their claim upon the property recognized.

Seven of the passenger conductors on the road were summarily discharged recently and their places given to other men promoted. The cause of discharge is not stated.

#### International & Great Northern.

A large force is at work on the extension from Rockdale, Tex., to Austin and work is being vigorously pushed. It is stated that iron enough has been bought to lay the track to Round Rock, 43 miles westward from Rockdale and 17 from Austin. It is expected that trains will run to Taylor, 26 miles by the end of June. Taylor is on Mustang Creek and directly on one of the principal cattle trails and is likely to be an important shipping point. It is not expected that the track will reach Austin before Fall.

#### Canada Southern.

At the annual meeting in St. Thomas, Ont., last week, a resolution was adopted ratifying and confirming the transfer of the majority of the stock to Commodore Vanderbilt. A new board of directors was chosen, in which the Vanderbilt influence is prominent.

#### Wyandotte, Kansas City & Northwestern.

Track is now laid to a point five miles east of Wellington, Mo., and 39 miles east from Kansas City. There remains but five miles more to carry the road to Lexington.

#### Illinois Central.

The Land Department reports for May sales of 610.42 acres for \$4,759.23. The cash collected on land contracts was \$16,365.01.

The Traffic Department reports earnings for May as follows:

	1876.	1875.	Inc. or Dec.	P. c.
In Illinois, 707 miles.....	\$461,094 63	\$449,593 98	Inc. \$11,500 65	2.6
In Iowa, 402 miles.....	\$241,874 27	\$255,285 97	Dec. \$13,412 60	19.6
Total, 1,109 miles.....	\$702,968 90	\$704,880 95	Dec. \$18,912 05	3.1

The Illinois earnings were \$652 per mile, the Iowa earnings \$311, and the average for the whole line \$528 per mile.

#### Waterville & Washington.

This Kansas company has been reorganized and it is said that arrangements have been made to begin work upon it at once. It is to be built and worked as an extension of the Central Branch, Union Pacific, and that company now controls the management.

#### Lafayette, Muncie & Bloomington.

In the Lafayette crossing case the United States Circuit Court has approved the report of the Special Commissioner and made an order accordingly, providing that the Indianapolis, Cincinnati & Lafayette Company shall sell the Lafayette, Muncie & Bloomington right of way for an independent track into Lafayette, and shall permit such track to be laid from the place of the proposed crossing. This is virtually a compromise, the crossing plan being given up.

#### Cincinnati Southern.

John Smith & Co., the contractors for the masonry of the Tennessee River bridge, being much behind with their work, and the trustees having reason to believe that they would fail to carry out the contract, it has been transferred to the firm of R. G. Huston & Co., who are now going on with the work.

#### New Jersey Midland.

The Chancellor of New Jersey has admitted the second and third-mortgage bondholders as parties in the foreclosure suit. This action is claimed as a substantial recognition of the Balesier-Doyle Committee and its plan of reorganization.

#### Selma, Rome & Dalton.

This road is now in better condition than ever before, the present management having steadily pursued the policy of improving it. The business is increasing and there is a gradual improvement in the coal and iron interests along the line. Much is hoped from the approaching completion of the Cincinnati Southern, which will give the road an outlet independent of all connection with its rivals.

#### St. Louis, Kansas City & Northern.

The track is now all laid on the new branch connecting this road with the Union Depot in St. Louis, and it will be formally opened in a few days. The new line leaves the main line at Ferguson, 11 miles from the old terminus in St. Louis, and is 11.5 miles long. It passes through Forest Park, and opens up some very good country for suburban settlement, besides securing the desired connections in St. Louis.

#### Rensselaer & Saratoga.

The long bridge over the Hudson River at Fort Edward, N. Y., took fire June 7 and was entirely destroyed. Work on a temporary bridge was begun at once, and trains passed over it June 12. The burned bridge was 640 feet long, and was built in 1855 to replace one burned at that time.

#### Kansas Pacific.

Certain taxpayers of Trinidad County, Col., have sued out an injunction against the issue of the county bonds voted in aid of the extension of the Arkansas Valley branch from La Junta to Trinidad. Irregularities and fraud in the election are charged.

#### Intercolonial.

The line from Moncton to Riviere du Loup is now open for travel and freight, and mixed trains began running June 12. Express trains will be put on July 3 and will make the trip from Quebec to St. John in 24 hours and to Halifax in 27 hours.

There is a good deal of talk of the purchase by the Government of the Riviere du Loup Division of the Grand Trunk, over which the Intercolonial trains run to Quebec. The Grand Trunk will doubtless be very willing to sell the line, which has a very light traffic.

#### Pennsylvania & Sodus Bay.

This unfinished road was sold at auction under foreclosure of mortgage in Trumansburg, N. Y., June 10. It was bid in for \$24,750 by Mr. Merritt King, who represents some of the bondholders.

#### Wilmington & Reading.

In view of the recent decision of the United States Circuit Court that, under the Delaware charter, the franchise of the company are not covered by the mortgage, it is said that the foreclosure suit will not be pressed at present, and that application will be made to the Delaware Legislature for an act authorizing the transfer of the franchise to the parties who may buy the real estate and other property.

#### Illinois Midland.

In the Illinois Circuit Court at Decatur, June 8, the Court gave its decision on a demurrer entered to the pleas of the company in answer to the complaint in the *quo warranto* suit heretofore referred to. The Court holds that the charter of the Peoria, Atlanta & Decatur Company gave it authority to purchase any road which might form part of its proposed route,

but it is very doubtful whether that could be extended so as to include any road beyond the two terminal points, Peoria and Decatur. Moreover, the Peoria & Decatur had no power to sell its road or consolidate with any other company. The sale of the road to the Peoria, Atlanta & Decatur must therefore be held void and of no effect. The demurrers are sustained, but leave is given the company to file a new plea in answer.

#### Southern Pacific.

The track is now laid to Keene, Cal., 14 miles beyond Caliente, and there reaches the summit in the Tehachapi Pass. Regular trains now run through to Keene, which is 338 miles by rail from San Francisco. A very large number of men is at work between Keene and San Fernando and in the tunnel at the latter place, and it is still expected that the line to Los Angeles will be open by July 4.

On the line beyond Los Angeles the work of tracklaying is being pushed towards the Colorado River, and the track is expected to reach the river by the end of July. At latest accounts the end of the track was 150 miles east by south from Los Angeles.

#### New Orleans, St. Louis & Chicago.

Messrs. Kelly & Alexander, No. 68 William street, New York, give notice that they will buy at par the coupons of the Mississippi Central first-mortgage bonds, which became due May 1, 1876.

#### Chicago, Burlington & Quincy.

This company gives notice that under its contract with the Keokuk & St. Paul Company the sum of \$290,385.54 is now applicable to the purchase of the bonds of the latter company, at a price not above par and accrued interest. Holders of the bonds are invited to send proposals for their sale to John N. Denison, Assistant Treasurer, Boston, until June 21. They should be endorsed "Proposals to sell Keokuk & St. Paul Railroad bonds."

#### Central Pacific.

The San Francisco Real Estate Circular of June 1 says: "Work has been commenced on the Northern Railway at Oakland; the grading and bridging are now nearly completed to the Willows or Shell Mound—a distance of about three miles from Oakland Point. The grading of the Berkeley Branch, which diverges from the main line at the above-mentioned point, is well advanced. The grading of the main line to West Berkeley, and possibly farther, will be continued with little if any delay. Upon its completion the track will be laid immediately and the road operated by local trains to connect with the present ferry-boats. This road, which will probably be open to Berkeley early in July, will afford another outlet to those who are anxious to secure lots across the bay."

#### Long Island.

Mr. T. B. Wallace, a stockholder and director of this company, has applied to the New York Supreme Court for an injunction to restrain the company from carrying out the leases of the Southern and the Flushing, North Shore & Central roads. The grounds of the application are that the leases will prove injurious to the leasees and may possibly cause it to become bankrupt, to the great detriment of the stockholders. The Court granted a temporary injunction and will hear argument hereafter on the question of continuing it.

#### Cairo & St. Louis.

The operations of this road for April are reported as follows:

Gross earnings (\$122 per mile).....	\$17,882 51
Current expenses (\$1.06 per cent.).....	\$16,284 27
Extraordinary expenses (\$9.02 per cent.).....	3,402 64
Total expenditures.....	19,686 91

#### Excess of payments over receipts.

Passenger trains ran 9,737 miles; freight trains, 7,313; coal trains, 5,872; a total of 22,922 miles. The average earnings per train mile were: for passenger trains, \$0.5764; freight trains, \$1.1317; coal trains, \$0.68. The road worked is 146½ miles long.

#### Keokuk, Iowa City & Minnesota.

At the annual meeting in Washington, Ia., June 7, a committee was appointed to investigate the past management and present condition of the company, and report within 30 days.

#### Burlington & Clinton.

Mr. J. A. Rhombert, President of the Chicago, Dubuque & Minnesota and the Chicago, Clinton & Dubuque companies, is working up a project for a new road to run near to and on the west side of the Mississippi, from Clinton, Ia., through Davenport to Burlington, about 140 miles.

#### Burlington, Keosauqua & Western.

This company was organized at a convention held in West Point, Ia., June 8. The object is to build a narrow-gauge road from Burlington, Ia., through Denmark and West Point to Keosauqua, with a possible extension westward. The capital stock is fixed at \$250,000, with power to increase.

#### Dallas & Wichita.

The contract with Henderson & Searry for the grading from Dallas, Tex., to Denton has been signed and the contractors began work May 30.

#### Galveston, Harrisburg & San Antonio.

The Galveston News is informed that iron enough has been bought to complete the road to San Antonio. Tracklaying from Kingsbury westward was to be begun June 12.

#### Dividends.

Dividends have been declared by the following companies:

New York Central & Hudson River, 2 per cent., quarterly, payable July 16.
Western Union Telegraph, 1½ per cent., quarterly, payable July 15.
American Express, \$3 per share, payable July 1.
New York, New Haven & Hartford, 5 per cent., semi-annual, payable July 1.
Fitchburg, 4 per cent., semi-annual, payable July 1.
Philadelphia, Wilmington & Baltimore, 4 per cent., semi-annual, payable July 1.
New York & Harlem (New York Central & Hudson River, lessee), 4 per cent., semi-annual, payable July 1.
Lehigh Valley, 2½ per cent., quarterly, payable July 15.

#### Springfield, Jackson & Pomeroy.

The directors at a recent meeting ordered that work on the Springfield end of the road should begin at once. A new location has been ordered in the vicinity of South Charleston, O., which makes the line more direct, but takes it some two miles south of the town. This action is taken in consequence of some trouble about the local subscription.

#### Sharon.

This road is now fully completed and trains are running over it. It is leased to the Atlantic & Great Western Company, and forms an extension of the Mahoning Division of that road from its former terminus at Sharon, Pa., north by east to the main line at Cape Horn, now known as Sharon Junction, a distance of 8½ miles. It is of standard gauge, the same as the Mahoning Division, and a third rail has been laid on the wide-gauge main line from Sharon Junction to Shenango, 5½ miles, where connection is made with the Shenango & Allegheny Valley road. This completes a line of standard gauge from Cleveland to the



eastern terminus of the Shenango road, 145 miles and makes it possible to ship coal and oil from the line of the Shenango road through to Cleveland without the transfer heretofore required. It also furnishes a new line for eastward bound traffic from Youngstown.

#### Savannah & Charleston.

The Receiver's report for the three months ending April 30 is as follows:

Balance, Feb. 1.....	\$9,272 39
Freight, passage, mail and connecting roads.....	96,001 60
Bills payable, Junction Branch.....	6,000 00
Atlantic & Gulf R. R., Junction.....	400 00
" " " bond account.....	8,415 60
Open accounts.....	11 00
<b>Total.....</b>	<b>\$120,100 59</b>
Expenses, pay-rolls, salaries, connecting roads, iron, etc.....	\$85,330 04
Arrears to employees.....	5,193 50
Legal costs, interest and exchange.....	608 82
Bills payable, Junction Branch.....	12,000 00
Atlantic & Gulf R. R., Junction Branch.....	400 00
" " " construction account.....	1,390 15
<b>Total.....</b>	<b>104,912 51</b>

Balance, April 30 ..... \$15,188 08

The Receiver's receipts for the quarter were therefore \$5,915.69 greater than his disbursements.

#### Erie.

In accordance with a law of New York, passed in 1875, which gives authority to the directors of any company whose annual meeting now takes place within three months before Sept. 30, to change the time of such meeting to a day not more than two months after Sept. 30, on giving 30 days' public notice of such change, the board of directors gives notice that the annual meeting of this company, heretofore held on the second Tuesday of July, will hereafter be held on the fourth Tuesday of November.

The change is a matter of convenience, the law of New York requiring the returns to the State Engineer to be made for the year ending Sept. 30. The fiscal year of the company has been fixed accordingly, and this makes it possible to present the report at the annual meeting, shortly after its close.

#### Philadelphia & Reading.

This company announces its intention of running excursion trains to Philadelphia from any town in the mining regions from which 500 passengers can be secured. The special train will leave early in the morning, run at a good rate of speed, and the arrival and return will be so timed as to give the excursionists eight hours at least in the Centennial grounds. The fare for the round trip will be \$2 from all points.

#### Baltimore & Drum Point.

The County Commissioners of Anne Arundel County have at last resolved to make the long-talked-of subscription of \$200,000 to this road, but have added to it the condition that Baltimore city shall agree to endorse the bonds of the company for \$500,000. It is very doubtful whether this Baltimore endorsement can be secured.

#### Toledo, Peoria & Warsaw.

Receiver Hopkins reports for April and May as follows:

Balance, April 1.....	\$9,649 37
Freight accounts.....	233,792 36
Passenger accounts.....	53,055 19
Car-service, express and miscellaneous accounts.....	22,562 90
<b>Total.....</b>	<b>\$309,059 82</b>
Pay-rolls, vouchers, rents and miscellaneous.....	308,716 89
<b>Balance, June 1.....</b>	<b>\$942 93</b>

The disbursements were \$8,706.44 in excess of the receipts.

#### San Francisco & North Pacific.

The Guerneville Branch is completed, and regular trains began to run over it May 28. It leaves the main line at Fulton, Cal., 27 miles north of the San Francisco Bay terminus at Donahue, and runs nearly due west to Guerneville on Russian River. It is about 17 miles long.

The company has consented to have an inspection made of the route of the proposed extension from Cloverdale northward to Ukiah, but declines to make any promises as to building it. The people along the line are very anxious to have the extension built.

#### Montclair & Mendham.

A company has been organized under the New Jersey general law to build this line, which was projected and partly graded some years ago as a branch of the Montclair Railroad. The line is from Montclair, N. J., westward through Caldwell, Hanover and Morristown to Mendham, about 25 miles, and it is now proposed to extend it some 20 miles further to a connection with the Easton & Amboy road.

#### Ulster & Delaware.

The bridge over Esopus Creek, near Rondout, N. Y., was destroyed by fire on the morning of June 7, causing a loss of \$15,000. It is believed that it was set on fire by some quarrymen who were on a strike, to prevent the road from hauling stone from the quarry.

#### Chicago, Rock Island & Pacific.

The people along the line are trying to induce this company to extend its Winterset Branch from Winterset, Ia., south by west through Afton to Mt. Ayr in Ringgold County. The distance is about 45 miles through a good and well settled country.

#### Des Moines, Hampton & Minnesota.

A new company by this name has been organized in Des Moines, Ia. Its object is to extend the Des Moines & Minnesota road from its present terminus at Ames, Ia., north by east through Alden or Iowa Falls and Hampton to a connection with the Iowa & Dakota Division of the Chicago, Milwaukee & St. Paul. The distance is about 90 miles, and liberal promises of local aid are made. The northern half of the line would be so far from the Central road.

#### Chicago, Danville & Vincennes.

The United States Circuit Court has granted leave to Edward H. Wright to file a cross-bill in the foreclosure suit. The object of the bill is to protect the rights of holders of the Indiana Division first-mortgage bonds, for which it is claimed, no provision has been made in the present suit. It is also charged that the equipment of the two divisions has not been kept separate and that a part of the proceeds of the Indiana Division bonds has been spent upon the Illinois Division.

#### Springfield, Athol & Northwestern.

This company has prepared plans for a depot building on Main street, in Springfield, Mass., to be built of brick and granite. It is to be four stories high, the first story to contain waiting rooms, ticket office, etc., and a large store, the upper floors to be used for the company's offices and for offices and rooms to be rented. The store on the first floor will also be rented. The train-house will be in the rear.

#### Montclair & Greenwood Lake.

Two new engines, six passenger and a number of freight cars have been put upon the road. There is to be a general reduction in expenses, so far as possible, and an attempt will be made to put the road in good order. Additional trains are to be put on and steps taken to improve the business of the line.

### ANNUAL REPORTS.

#### Mobile & Ohio.

This company's lines are as follows:

	Miles.
Main Line, Mobile, Ala., to Columbus, Ky.....	472
Gainesville Branch, Marketa, Miss., to Gainesville, Ala.....	21
Columbus Branch, Marketa, Miss., to Columbus.....	14
Oakliff Branch, Marketa, Miss., to Marketa.....	11
Aberdeen Branch, Marketa, Miss., to Aberdeen.....	9

**Total..... 527**

On May 1, 1875, the trustees under the first mortgage took possession of the property, the interest on the bonds having then been in default one year. These trustees were subsequently appointed receivers by the United States Circuit Court and still hold possession. The present report, which covers the calendar year 1875, is therefore made up from figures for the first four months contributed by the company and for the last eight months by the trustees and receivers.

The capital account is as follows:

Stock (\$10,000 per mile).....	\$5,320,000
First-mortgage bonds.....	\$9,648,220
Coupons matured and unpaid.....	1,462,350
<b>Total.....</b>	<b>11,110,570</b>
Second-mortgage bonds.....	\$1,453,848
Coupons matured and unpaid.....	116,308
<b>Total.....</b>	<b>1,570,156</b>
Convertible bonds.....	\$977,550
Interest matured and unpaid.....	78,304
<b>Total.....</b>	<b>1,055,754</b>
Gainesville Branch bonds, principal overdue.....	\$63,000
Coupons matured and unpaid.....	8,480
<b>Total.....</b>	<b>61,480</b>

Stock (\$10,000 per mile).....	\$5,320,000
First-mortgage bonds.....	\$9,648,220
Coupons matured and unpaid.....	1,462,350
<b>Total.....</b>	<b>11,110,570</b>

**Total funded debt (\$26,182 per mile)..... \$13,797,960**

Floating debt (\$1,437 per mile)..... 787,370

Profit and loss..... 1,902,581

**Total (\$41,325 per mile)..... \$21,778,461**

Of the floating debt \$582,386 is debt incurred by the company, and \$174,984 by the receivers.

The earnings for the year were as follows:

	1875.	1874.	Inc. or Dec.	P. c.
Freight.....	\$1,423,999	\$1,838,924	Dec.	\$414,925 22.6
Passengers.....	351,168	429,631	Dec.	78,463 18.3
Mails.....	61,727	61,727		
Express.....	54,725	60,737	Dec.	6,012 9.9
Miscellaneous.....	22,788		Inc.	22,788
<b>Total.....</b>	<b>\$1,914,347</b>	<b>\$2,391,019</b>	<b>Dec.</b>	<b>\$476,672 10.9</b>
Working expenses.....	1,552,894	1,390,260		7.7
<b>Net earnings.....</b>	<b>\$361,453</b>	<b>\$707,865</b>	<b>Dec.</b>	<b>\$346,412 48.9</b>
Gross earn. per mile.....	3,633	4,337	Dec.	904 19.9
Net " " " ".....	686	1,343	Dec.	657 48.9
Per cent. of exps.....	81.12	70.39	Inc.	10.73 15.2

The income account of the company for the four months up to May 1 was as follows:

Net earnings.....	\$81,819
Interest, sundry accounts.....	15,215
Sale of town and county bonds.....	163,294
Decrease floating assets.....	148,324
Increase floating liabilities.....	164,905
<b>Total.....</b>	<b>\$519,557</b>

Bills payable, supplies, etc., 1874..... \$354,444

Balance of unpaid labor, 1874..... 128,945

Advances paid..... 29,072

Real estate..... 3,095

**Total..... 513,557**

The Receiver's account for the last eight months was as follows:

Net earnings.....	\$279,635
Loans and advances.....	390,482
Sale of town bonds.....	11,315
Increase floating liabilities.....	174,973
<b>Total.....</b>	<b>\$856,405</b>

Interest paid..... \$4,192

Loans repaid..... 371,157

Mobile & Ohio Co., audited bills paid..... 154,349

" " " unpaid labor paid..... 103,524

Judgment, duty on rails..... 26,104

Increase floating assets..... 197,080

**Total..... \$66,406**

A plan of reorganization, the features of which have been already noted, has been prepared and submitted to the security-holders.

#### Atchison, Topeka & Santa Fe.

This company works the following lines:

	Miles.
Main line, owned, Atchison, Kan., to Colorado line.....	470.10
Pueblo & Arkansas Valley R. R., leased, Colorado line to Pueblo.....	148.33
Kansas City, Topeka & Western, leased, Kansas City to Topeka.....	66.00
Wichita & Southwestern, leased, Newton to Wichita.....	27.28
<b>Total.....</b>	<b>711.61</b>

The whole forming a main line 618.33 miles long, from Atchison, Kan., to Pueblo, Col., with branches to Kansas City and to Wichita. The 66 miles of the Kansas City, Topeka & Western road include 16 miles (Lawrence to De Soto) the use of which is leased from the St. Louis, Lawrence & Western. The Colorado & New Mexico Company, which owned 11 miles of road from the Colorado line to Granada was consolidated with the Pueblo & Arkansas Valley Company, Oct. 1. The ownership of the last named company is almost identical with that of the Atchison, Topeka & Santa Fe. The line to Pueblo was not completed until after the close of the year covered by the report, which is the calendar year 1875, and the Kansas City line was leased from Oct. 1. The average mileage for the year was 547 miles.

The equipment consists of 38 engines; 20 passenger, 2 sleeping and 7 baggage, mail and express cars; 19 box, 300 combination, 100 stock, 42 flat, 294 coal and 19 caboose and way cars; 1 pay-car, 189 hand and 85 push cars. The Superintendent reports that 10 or 15 more engines and a number of freight cars are needed.

The company has a very large land grant, of which patents have been received for 2,476,126.46 acres, and patents for 458,457.58 acres more have been applied for, making 2,934,684.04 acres in all. Sales during the year were 75,413.33 acres for \$416,409.85, an average of \$5.52 per acre; total sales up to close of year \$26,592.80 acres for \$2,761,221.51. The Land Department reports for 1875 cash receipts on principal and interest of land contracts of \$217,710.41; its expenses for the year were \$67,261.10. A large part of the land sold has been sold on long time.

The capital account is as follows:

Stock (\$15,325 per mile).....	\$8,615,000 00
First-mortgage bonds.....	\$7,941,000
Land-grant bonds.....	3,374,500
Consolidated mortgage bonds.....	3,050,000
Notes given for funded coupons.....	506,000
Land income bonds.....	476,000
<b>Total.....</b>	<b>14,466,500 00</b>
Contingent liability, Potawatomi bonds.....	499,500 00
Notes and accounts due for 1875.....	142,917 98
Coupons due Jan. 1, 1875.....	316,302 96
Treasurer's balance.....	38,236 82
<b>Total (\$51,177 per mile).....</b>	<b>\$24,088,464 71</b>

The cost of road and equipment is reported at \$23,355,545.83,

or \$49,682 per mile. The land income bonds bear 12 per cent. interest in currency; the funded coupon notes 7 per cent., currency, and the rest of the debt 7 per cent., gold. The interest liability (in currency) for 1876 is estimated at \$764,302. The funded coupon notes are due at various periods, from 1877 to 1882.

The work of the year was as follows:

	1875.	1874.	Inc. or Dec.	P. c.
Passenger train mileage.....	285,944			
Freight " " " ".....	681,170			
Service and switching mileage.....	137,364			
<b>Total train mileage.....</b>	<b>1,104,478</b>	<b>796,946</b>	<b>Inc.</b>	<b>307,532 38.6</b>
Passengers carried.....	72,942	69,639	Inc.	3,303 4.7
Passenger mileage.....	7,166,882	7,597,618	Dec.	430,736 5.6
Tons freight carried.....	262,384	186,312	Inc.	66,072 35.5
Tonnage mileage.....	40,244,990	27,495,279	Inc.	12,749,711 68.2

The average passenger train load was 25, and the average freight train load 69½ tons in 1875.

Of the tonnage mileage 39.6 per cent. was of eastward and 60.4 per cent. of westward bound freight. The tonnage eastward included 28,399 tons of grain, 70,955 head of cattle, 627 horses, 2,103 hogs and 13,761 head sheep. Texas shipments decreased slightly, but Colorado stock shows a large gain. A great increase in grain is anticipated this year.

The average cost of engine service per mile was 21.72 cents. The cost of coal used has been diminished by the opening of new mines. A further saving has been made since the completion of the road to Pueblo, by using Colorado coal on that end of the line, thereby saving a long haul.

Average results of working were as follows:

	Receipt.	Cost.	Net receipt.
Per passenger train mile.....	\$1.1700	\$0.7474	\$0.4226
" freight " " " ".....	1.6390	0.8671	0.7719
" passenger per mile.....	4.710 cts.	2.982 cts.	1.728 cts.
" ton " " " ".....	2.410 "	1.277 "	1.133 "

The earnings for the year were as follows:

	1875.	1874.	Inc. or Dec.	P. c.
Freight.....	\$1,116,749 44	\$836,197 39	Inc.	\$280,552 05 33.6
Passengers.....	337,263 18	341,970 21	Dec.	4,707 03 1.4
Express, mail, etc.....	66,345 69	73,638 08	Dec.	6,292 40 8.7
<b>Total.....</b>	<b>\$1,520,358 31</b>	<b>\$1,251,805 69</b>	<b>Inc.</b>	<b>\$268,552 62 21.6</b>
Working expenses.....	608,760 47	667,641 84	Inc.	141,106 63 25.3
Taxes.....	77,680 51	67,100 52	Inc.	10,579 99 15.8
<b>Total.....</b>	<b>\$770,430 98</b>	<b>\$624,742 36</b>	<b>Inc.</b>	<b>\$145,688 62 24.3</b>

Net earnings..... \$749,927 33

Gross earnings..... \$2,779

Net earnings per mile..... \$2,407

Net earnings per mile..... \$2,407

Per cent. working..... 45.06

Per cent. expenses and taxes..... 48.95

Per cent. net earnings..... 1.12

The income account may be summed up as follows:

Net earnings.....	\$749,927 33
Taxes Wichita R. R., charged account.....	1,629 50
Balance of income account.....	6,959 83
<b>Total.....</b>	<b>\$758,416 66</b>

Rentals paid..... \$82,530 90

Interest and gold premium..... 643,933 40

Insurance, etc..... 4,621 00

Expense, Boston..... 16,431 36

Profit and loss..... 5,000 00

**Total..... 752,416 66**

During the year 15,045 feet were added to the sidings in use, 319 tons of re-rolled iron and 18,541 new ties were used in repairs. About 1,200 tons of iron and 35,000 ties are needed this year. Bridges have been kept in good repair, and a new pile bridge, 108 feet long, built. A number of new buildings have been erected.

The Pueblo & Arkansas Valley road has been leased for 30 years without any guarantee. The rental of the Kansas City line gives the road a new outlet and valuable Eastern connections, especially for its stock traffic. The road is now dependent upon the Missouri River, Fort Scott & Gulf for its terminal facilities there, but some new arrangement will have to be made soon. For the current year a large increase in grain, stock, and in Colorado and New Mexico business is expected, and these expectations have thus far been fully realized.

#### Boston, Concord & Montreal.

The thirtieth annual report of this company covers the year ending March 31. The company owns and works a line from Concord, N. H., north by west to Woodville and thence north-east to the Grand Trunk at Groveton Junction, 145 miles, with a branch from Wing Road to Fabyan, in the White Mountains, 15 miles. There has been no increase of track during the year, but an extension of the branch from Fabyan to the foot of Mount Washington, seven miles, is under construction and will probably be completed by July 1. An extension of the main line from Groveton Junction to Colebrook is contemplated.

The equipment consists of 27 engines; 24 passenger, 2 drawing room and 14 mail and baggage cars; 595 freight cars. During the year 1 engine, 1 passenger and 1 baggage car were added, 1 passenger car changed to drawing room, 1 passenger and 18 freight cars rebuilt; 6 engines received extensive repairs.

The credit side of the capital account is as follows:

Common stock.....	\$1,000,000 00
Preferred stock.....	800,000 00
<b>Total stock (\$11,250 per mile).....</b>	<b>\$1,800,000 00</b>
Bonded debt (\$14,963 per mile).....	2,394,000 00
Unclaimed dividends and coupons.....	12,066 39
Profit and loss.....	559,306 31
<b>Total (\$29,784 per mile).....</b>	<b>\$4,766,372 70</b>

During the year \$245,100 consolidated bonds have been sold and the proceeds used for the extension of the Fabyan Branch. The trustees of the sinking fund hold \$800,000 of bonds. The old stock has not yet been all returned and the consolidated stock has consequently not yet been issued.

The work done was as follows:

	1875-76.	1874-75.	Inc. or Dec.	P. c.
Train mileage.....	861,397	624,271	Inc.	36,936
Passengers carried.....	228,634	187,260	Inc.	41,374
Passenger mileage.....	7,232,991	11,235,806	Dec.	4,002,609
Tons freight moved ..	117,631	88,672	Inc.	29,159
Tonnage mileage.....	7,069,858	5,320,320	Inc.	1,749,538



tracted for as soon as the extension of the Fabyan Branch is completed, and an increase of passenger business is also looked for.

The income account for the year is as follows:

Net earnings.....	\$181,012 33
Balance on hand from previous year.....	141,956 58
Interest received.....	27,734 16
Decrease in Superintendent's cash on hand.....	14,540 12
"    "    shop stock.....	5,218 50
Sale of consolidated bonds.....	245,100 00
<b>Total.....</b>	<b>\$614,556 69</b>
Coupons and interest paid.....	\$148,154 51
Dividends on preferred stock.....	45,240 00
Mt. Washington Extension.....	245,000 00
Sundry expenses.....	5,146 91
Increase in supplies on hand.....	31,432 47
	474,982 89

Balance, cash and bonds, on hand.....\$139,573 80

The increase in supplies is greater by \$11,196.07 than the decrease in other accounts, showing an improvement in the company's condition to that amount.

During the year 93,533 new ties and 1,000 tons of 56-pound iron rails have been laid. Two new bridges have been built, and that over the Connecticut at Wells River repaired. The road-bed, track and buildings have been maintained in good condition.

The Portland & Ogdensburg Company now leases the use of 22 miles of track, from Fabyan to Wing Road and thence to Dalton.

The lease of the Southeastern Railway to this company and the Connecticut and Passumpsic Rivers expired in March, and was not renewed, but arrangements have been made by which it is practically continued and the through line to Montreal formed by the three roads maintained.

The report refers to the death, in January, of Col. Charles Lane, who had been clerk of the corporation from its first organization in 1845, and a valuable and efficient officer.

#### Baltimore & Potomac.

This company owns a line from Baltimore to Washington, 43 miles, with a branch from Bowie, Md., southward to the Potomac at Pope's Creek, 49 miles. Its entrance into Baltimore and connection with the Northern Central there is through a very costly tunnel, and other expensive works.

The capital account is as follows:

Stock (\$34,076 per mile).....	\$3,503,000
First-mortgage bonds.....	3,000,000
Second-mortgage bonds.....	1,500,000
Income bonds.....	1,133,000

Total bonds (\$61,228 per mile).....\$5,631,000

Total (\$99,304 per mile).....\$9,136,000

The bonds are guaranteed by the Pennsylvania and Northern Central.

For the year ending Dec. 31 the business done was as follows:

	1875.	1874.	Inc. or Dec.	P. c.
Passengers carried.....	1,000,706	783,623	Inc.	247,083 31.5
Tons freight carried.....	215,859	161,314	Inc.	54,545 33.8

The great bulk of the business is through traffic between Baltimore and Washington. The local business of the main line is not large, and the traffic of the Pope's Creek Branch is very light.

The earnings and expenses for the year were as follows:

	1875.	1874.	Inc. or Dec.	P. c.
Gross earnings.....	\$678,091 69	\$615,415 36	Inc.	\$62,676 33 10.2
Working expenses.....	\$590,012 72	\$494,908 46	Inc.	\$95,104 26 13.4

Net earnings.....	\$128,078 97	\$120,506 90	Dec.	\$7,572 07 6.3
Gross earnings per mile.....	\$7,371	\$6,680	Inc.	\$692 10.2
Net earnings per mile.....	1,392	1,419	Dec.	27 1.9
Per cent. of exp's.....	81.11	78.79	Inc.	2.32 2.9

The earnings and expenses were divided as follows:

	Earnings.	Expenses.	Net earn. or deficit.	P. c. of exp's.
Washington line.....	\$638,992 39	\$597,205 60	\$131,786 78	\$14,860 79.38
Pope's Creek line.....	39,099 31	42,807 12	3,707 81	798 109.48
<b>Total.....</b>	<b>\$678,091 69</b>	<b>\$590,012 72</b>	<b>\$128,078 97</b>	<b>\$7,371 81.11</b>

President Bowie's report says:

"The general expenses of 1875 were reduced 50 per cent., and the other increased expenditures occur mainly in maintenance of way, in conducting transportation, and increased taxation on real estate, particularly on the passenger depot in Washington, which not being paid in 1874, made the amount in 1875 double the sum properly chargeable to that year. The increase in maintenance of way is caused by laying over 500 tons of steel rails and nearly 17,000 new cross-ties; and improvements about the Washington depot. In addition, five Lorenz switches and ten steel frogs have been put in at Fulton junction, Lafayette end of double track, Calverton road, Annapolis junction and south end of Long Bridge, Washington; and high signals erected at Fulton, Lafayette, Calverton, Odenton, Bowie, navy yard and long bridge. Grading has been done for double track at different stations, and from the navy-yard tunnel to the Eastern Branch bridge. In Washington much change has been made in our tracks to make our grades conform to those recently established by the engineer of the District, and several new buildings for warehouses and freight delivery erected in place of old ones torn down to meet the requirements of the city authorities. The property purchased by the company at Fourteenth street in Washington has been converted into an extensive coal yard by the erection of three series of trestles, each laid with double tracks, and the yard graded, paved and enclosed.

"The bridges over all the streams and rivers between Washington and Baltimore have been repaired and greatly strengthened by additional floor beams, &c.; all the superstructure above the piles, 1,510 feet in length, except the Howe truss of the Eastern Branch pile bridge has been renewed; general repairs, including track stringers and floor beams of three spans, have been made on the Long Bridge, and the channel widened at the south draw to give a clear width between the tender piles of over 66 feet. On the Pope's Creek line nearly all the bridges have also been repaired and strengthened, additional platforms and sidings laid, the turn-tables at Pope's Creek rebuilt, and other improvements made. There has also been an increase of expenditure in repairs of cars and motive power to keep both up to a proper standard of excellence and for the requirements of our largely increased service.

"The transportation per passenger per mile was seven-tenths of a cent, and per ton one mill per mile less in 1875.

"The figures above given show a large and steady increase from May, 1872, when the road was first opened, in which year its revenues were only \$137,554.97; and are the more remarkable that the general business depression, largely affecting all railroads, has been increasing since 1873. While very few roads have been able to keep up their receipts, ours have trebled since 1872; and although the ratio of the operating expenses to the gross receipts is unquestionably large, it must be borne in mind that we are required to keep up a large train service, more expensive terminal arrangements, and a higher standard of efficiency generally than the present business warrants, because of a keen rivalry with one, and our connections with other lines. If the present net results are, therefore, not as favorable as any would desire, we must remember that in addition to several extraordinary expenses in 1873, which we are now better provided against in the future, the comparison with the

year 1874 could not but be unfavorable, as the expenses of that year were in common with every other road reduced to a point at which they could not long be maintained, and we may look confidently to the future development of business more commensurate with present expenditures. For the successful operation and management of the road we feel that we are greatly indebted to our officers and employees for their faithful and efficient services."

#### MASTER MECHANICS' ASSOCIATION.

##### Ninth Annual Convention.

(Concluded from page 251.)

The report of the Committee on Locomotive Tests was then taken up.

Mr. FORNEY said that the committee had received a number of statements which had been put in tabular form and sent to the printers. The copies had not yet been received, but would be inserted in the annual report.

The report was accepted, and its discussion announced to be in order.

Mr. FORNEY said that in the table referred to there were a great number of headings, showing just the kind of information needed. If such facts could be contributed by members of the Association it would give a better idea of the cost and economy of running locomotives than anything else he knew of.

Mr. FAY said it appeared from the report that considerable saving had been effected by the use of double instead of single nozzles.

Mr. WELLS said that the height of both nozzles was about the same. The saving he attributed to better draft. The single nozzle was 3/4 in. diameter, the double one, 2 1/2 in. This made a better draft and allowed them to run with a thinner fire.

Mr. EDDY said that with the single nozzle, on the exhaust of one cylinder the value on the other side was just right to let the pressure go over into the other cylinder and act against that piston, and there he thought the saving was. At one time there were not a dozen engines running into Boston with double exhaust nozzles. Now there are very few that do not have them.

Mr. FAY thought Mr. Eddy was right. He asked if the engine steamed as well and if there was any back pressure.

Mr. WELLS said they made no diagrams with reference to back pressure. The engine steamed more freely with the double nozzle, as the draft was better.

Mr. EDDY said the improved draft was because the exhaust went straight out and not over into the other cylinder.

Mr. STRATTON, Pennsylvania, said that he had had occasion to take diagrams from engines with single and double exhaust nozzles and believed it was clearly shown that with the single nozzle the effect is transmitted to the other cylinder. At the moment of exhaust the diagram in the other cylinder would show back pressure, sometimes 10 pounds to the square inch, and steam would remain there to the end of the stroke, causing a great deal of compression. The mere change of nozzles has almost removed the back pressure. The amount of lead was plainly shown on the diagram, and it showed the necessity of having it to take up the momentum of the moving parts. An excess of lead was very much against an engine working to its full capacity.

He had heard of an analysis of the gases at the top of the smoke-stack showing an excess of oxygen, which would indicate that more air passed through the grates than was needed for combustion.

Mr. FORNEY said he had taken diagrams and could confirm what Mr. Stratton said about the double nozzle.

Mr. BROOKS said that in 1864 there were many engines on the Erie with single nozzles. An experiment was made with a Taunton engine with a single nozzle placed on a saddle. There was a square partition between the exhaust cores, a slight bridge across the bottom of the central nozzle, leaving the opening very large. The experiments showed that when one cylinder exhausted the effect on the other was bad. That experiment led to the exclusion of single nozzles from the Erie, except in 20 engines he had just built. On these they had orders to put in a variable exhaust. They built six with single or variable exhaust, then the double nozzles were ordered for the next, and as soon as they got to work they had orders to discontinue their use. This matter was of more importance than was generally allowed. The quality of the expulsion of the exhaust determines the quality of the inlet of the draft. It is more positive with the single pipe. The exhaust has many turns to make, and the moment the line is let go there is nothing back of it, nothing to expel it, and there is a great disturbance. In building those engines with variable exhaust, they had changed the exhaust core from five to six inches. The first pipes sent down were five inches. After four or five had been sent down, there was a marked difference found. There was a square shoulder, which made a marked disturbance. There was room enough, but there was such a difference in the quality of the expulsion that it made a great difference in the draft. The greatest attention ought to be paid to the curved lines to be followed by the exhaust. The Convention here took a recess for an hour.

After recess the discussion on locomotive tests was resumed.

Mr. FORNEY said that he would like to get some expression of opinion as to the relative economy of heavy and light trains. Taking train expenses, fuel, oil, wages, etc., he had been astonished to see what seemed to be the great economy of large trains. The other questions of repairs of road and machinery came in, however. He then read, at the request of Mr. Eddy, from a report of a meeting of road masters of the Atlantic & Great Western road some opinions very unfavorable to mogul engines as being exceeding injurious to the track. If the injury to track was as great as indicated by these opinions, they would have to balance the matter and see whether the loss or gain by heavy trains was greatest. He hoped that they would look into this matter during the coming year.

Mr. MORRIS SELLERS considered the report of Mr. Dripps' experiments most valuable, as demonstrating the friction of engines of different construction on curves. He thought the result of these experiments was an answer to the road masters' criticisms. He had more confidence in his own judgment than in theirs.

Mr. EDDY asked what they were discussing. Mr. Dripps' experiments were not made with a locomotive at all, for it had no locomotive. It was simply a kind of car. The locomotive with its drivers connected and a train of wheels connected with it, going grinding and slipping along, was a very different thing from what Mr. Dripps had.

Mr. HUDSON said that, without questioning Mr. Dripps' competency, he was not satisfied that the experiments showed the relative difference between the engines. He, too, thought that they were simply carriages, and he was not informed as to whether they were pushed or drawn.

The President said Mr. Fry had stated that they were drawn on the curve.

Mr. HUDSON said that if they were drawn the friction would not be the same as if the locomotive propelled itself. He had no preferences as to the different classes of engines. Each was well adapted for a special class of service, but he doubted whether the mogul or consolidation engine was fitted for general freight service.

Mr. FAY thought that it was of great importance to collect

information on this question. The road masters' opinions were of no special value, for they gave no data, and there might have been defects of construction in the engines. There were other engines of the same general type which did not destroy the track. There were a large number of such engines in use; and if they could get a report from some one in charge of track where heavy engines were used, it would be of much importance. They might save money in one way which was lost in track repairs and other ways. He hoped the next committee would gather information on this point.

Mr. M. SELLERS said that the road masters had charged the moguls with flattening the curve. If they did so it must have been from the friction of the drivers, the long wheel-base forming a chord to the arc and twisting the track out of line. He thought Mr. Dripps' experiments very valuable. His locomotive had all the attributes of a locomotive except that there was no steam against the piston, and that had nothing to do with it. A man who had shown the ability Mr. Dripps had in these experiments deserved their highest consideration.

Mr. EDDY insisted that that was not properly a locomotive which had no power of locomotion. As to destroying the track, he had never seen a road master who did not tell the same story.

Mr. FAY said he had asked as to the effect the consolidation engines had on the track. The track supervisor had told him he thought the steel was wearing a little faster, but there was no flattening of curves or destruction of track. The value of the report was the collection of evidence. It was not necessary to pin their faith on Mr. Dripps' experiments, but it was desirable to collect all the evidence possible.

Mr. SELLERS agreed with Mr. Eddy that pushing an engine around a curve differed widely from running it around with steam. Both styles of engines, however, were tried in the same way, and he thought the experiment was all that could be made to show the relative friction of the different classes.

Mr. EDDY said that it was known to every master mechanic that, no matter how closely fitted the parallel rods were, there was always a perceptible slip between the main and secondary drivers. With another pair of wheels the slip would be greater. He had run on his road six-wheel-connected engines made by Baldwin 30 years ago, and he had seen them with the back wheels worn half an inch smaller than the forward ones, and the middle pair half way between. It made all the difference in the world whether the engine had steam on; the engine was merely a carriage and the connections did not come into play as when it was working.

Mr. LAUDER, Northern New Hampshire, moved that this discussion be closed, which was carried.

Mr. WELLS offered an amendment to the constitution relative to honorary members.

After some discussion it was amended so as to provide clearly that no dues should be required from honorary members and passed.

The name of Mr. P. H. Dudley, of Cleveland, O., was proposed as an associate member and referred to a committee consisting of Messrs. Philbrick, Robinson and Warren.

The Committee on Place of Next Meeting then presented Richmond, Va., Cincinnati and St. Louis. On motion New York was added and a vote taken, which resulted as follows: Richmond, 9; St. Louis, 23; Cincinnati, 5; New York, 13. On motion a second vote was taken on New York and St. Louis only, which stood: St. Louis 40; New York, 13. So St. Louis was selected for the next Convention.

An invitation to visit Atlantic City from the Camden & Atlantic Railroad Company was also received with thanks.

A vote of thanks to the Franklin Institute for the use of its hall and other courtesies was passed.

Mr. Dripps' resignation as a member was presented and received, and he was unanimously chosen an honorary member.

The election of officers being in order,

Mr. SEDGWICK moved that it be postponed for a year.

Mr. SELLERS suggested that the present officers be re-elected by acclamation.

The President said that the constitution required a vote by ballot. After some remarks by the President and Mr. Robinson the motion to postpone for a year was carried.

After a call from the Committee on Assessments, the special committee reported in favor of Mr. P. H. Dudley as an associate member and he was unanimously elected.

The report of the Committee on Subjects for the next meeting being called for,

Mr. WILDER, of the Erie Railway, moved that the committee having in charge this matter for the ensuing year be requested to hand in its report one month before the annual meeting and have it printed for distribution.

Mr. ROBINSON proposed to amend by including other committee reports and making the time a week before the meeting.

The President stated that it could not be done. The printing and preparation could not be arranged for, and besides many of the reports were not ready until the meeting began.

After some further remarks from Mr. Wilder the Secretary explained the difficulty and expense of such an arrangement, and the motion was withdrawn.

The committee then reported the following subjects for discussion in 1877:

1. Construction of Locomotive Frames and Bracing. The committee to report the best means of constructing these parts and attaching them to the boiler.

2. Slide Valves and Valve Gearing. The committee to report the best forms and proportions of valves, steam-ports and valve-gear, and the functions which they should fulfill in the distribution of steam in the cylinder.

3. Locomotive Boilers. The committee to report the best materials, method, form and proportion for the construction of locomotive boilers, and the best means of promoting combustion, especially with reference to the supply of air, the quantity which should be furnished and the best appliances for admitting it to the fire for each kind of fuel.

4. Feed Water. The best point in the boiler to introduce it and the cause and prevention of incrustation.

5. Locomotive Tests. The committee to request members to make experimental tests to show the performance of locomotives, and to report the results to the Association.

6. Engine and Tender Trucks. The best form of construction adapted for different classes of engines.

Mr. LAUDER, from the Committee on Assessments, reported that he had collected the dues, \$10 each, from 60 members.

Mr. ROBINSON suggested the advantage of setting apart a part of each day for asking and answering questions on technical subjects.

Mr. WOODCOCK moved a vote of thanks to the press of Philadelphia for the reports of the Convention, which was passed.

Mr. SELLERS moved a vote of thanks to the officers of the Convention for the gentlemanly and able manner in which they had conducted its business.

Mr. FORNEY moved to add faithful.

The vote of thanks was adopted.

The President called attention to the small number of answers to circulars received by the committees. He urged that the committees should receive more assistance from members, and that each should make a point of answering each circular, at any rate some of the questions. He referred to the report made by Mr. Wells and the amount of labor required to compile and tabulate the information contained in it. He again urged members to help the committees by answering their questions, and also requested the committees to have their reports early, so that the Secretary would have time to read them over before presenting them to the Convention.

On motion of Mr. Woodcock the Association then adjourned to meet in St. Louis in May, 1877.